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Journal of Applied Psychology

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The Role of the Psychologist in Market and Advertising Research *

Wallace H. Wulfeck

The Federal Advertising Agency, Inc., New York City

Psychologists, generally, have been trained for the work of the laboratory, clinic and classroom. These places have been their occupational milieu. With the exception of the few, who in late years have been working in the field of business and industry, not many are acquainted with the actual details, the scope, or the wide variety of interests which make up the business psychologists' day. This paper will try to provide an insight into these processes. It will (*a*) take a quick glance at the rapid expansion of psychology's contribution to industrial and business development during the past ten years; (*b*) make mention of some of the personalities who have played a part; (*c*) give a job description by examples; along with (*d*) a prediction of the place of psychological research in the present and post-war economy.

Much of the discussion will be centered around the work of the Research Director in an advertising agency. This presents no particular limitation because most agencies serve a rather large list of accounts, representing a broad sample of manufacturers. In our case, it runs from corsets to railroads and touching such products as food, drug sundries, cosmetics, clothing, sanitary protection, pencils, magazines, baby food, heavy industry, and the emergency recruitment of farm and food processing labor. The agency research service reaches deeply into the areas of production, labor, and distribution of many of these clients as well as investigating their advertising problems. Consequently, agency research is in reality industrial and business research.

We will not become involved here with the broad speculative problems concerning the economic justification of advertising, or the kind of political-economic organization which should, or will, exist following this terrible catastrophe. We can only assume, as most politico-economic

* Read at the February 1944 Meeting of the New York State Association for Applied Psychology.

prognostications suggest, that there will be no fundamental change in the industrial organization of this country except perhaps for a continued exercise of limited governmental control over the practices of business and industry. One needs only to read Stuart Chase: *Where's the money coming from?* [1] to realize the kind of a world we will live in and the collossal obligation of a controlled capitalism to maintain economic security for "We The People." It is the continued existence of this kind of a world which provides the occupational challenge for psychologists now and tomorrow.

The date at which applied psychology first gained a dawning recognition is debatable. For convenience, it may be placed around 1915–16 when Porter began publication of the *Journal of Applied Psychology*, or more specifically with the pioneering work of such men as Harlow Gale, Hugo Muensterberg, H. L. Hollingworth, E. K. Strong, and W. D. Scott. However, its great commercial impetus came much later in the business field following the developmental and promotional work of Link, Starch, and Gallup, among others. These men refined and expanded the now powerful methods known as marketing, public opinion and advertising measurement which have become useful tools in a wide field of socio-psychological, economic and military enterprises. Perhaps it is fair to say that by 1933 these methods and the national organizations to employ them effectively were reasonably well established.

The wide-spread acceptance of these and related methods has come only within the past ten years. In that brief span the growth has been phenomenal. The men and women recruited for this work came to it from many varied backgrounds and training. Almost none of them had training or experience in business, radio, or advertising. They brought to it one important element for success and that was a training grounded in scientific method, and a belief in its usefulness for solving the peculiar problems of business so far removed from the interests of the laboratory. Often they entered this field with grave misgivings, as though these fields of work were not a valuable or essential part of the life of our times, or would not allow uninfluenced freedom or scientific honesty in research. Notwithstanding, they came. Today the list of these people is formidable.

Who They Are

Here are a few of them taken from the membership lists of the A.P.A. and A.A.A.P. This list is by no means complete, and no one has been omitted with intent. A fairly large group have found their way into the services. There are two who have the M.A. degree, the rest hold the Ph.D.

[1] New York, 1943, The Twentieth Century Fund.

In Advertising Agency Research. George Gallup and Sam Hayes of Young and Rubicam, Otto Tinkelpaugh of J. M. Mathes Co., John B. Watson of Esty Co., Albert Blankenship of N. W. Ayer, Ernst Dichter of J. Sterling Getchell (now in radio), Alfred R. Root, and A. C. Welsh of Knox Reeves, Jean Pasmantier and W. H. Wulfeck of the Federal Advertising Agency.

With Independent Research Organizations. P. S. Achilles, Henry C. Link, Albert D. Freiberg, George Bennett, P. C. Corby, Eleanor Barnes of The Psychological Corporation; Daniel Starch of Daniel Starch Associates; Raymond Franzen and George Gallup of the Institute of Public Opinion.

Doing Radio Research. Frank Stanton, Ernst Dichter of the Columbia Broadcasting Company; Matthew Chappell with C. E. Hooper; Sidney Roslow, The Pulse of New York; Paul Lazarsfeld, and Robert H. McMurray.

In Government. Rensis Likert, and others.

Consultants. There is an important group of business, media, and radio research men holding faculty positions, among them D. B. Lucas and John Dollard, Readership; John Peatman, Radio; Hadley Cantril and Harry H. Field, Public Opinion; Arthur Kornhauser and Floyd Ruch, Marketing and Advertising; Harold E. Burtt and Howard P. Longstaff, Advertising.

It will be noted that two of those named are women recently come to this field. The work is wide-open to women having the interest, training, and personality for it.

Among business research leaders, psychologists tend to predominate as a professional group, but there are men from many other scientific disciplines holding prominent positions. They include economists, engineers, sociologists, and even chemists. Yes, psychology has made a place for itself in these fields even though it has failed to hold a dominant position in industrial and personnel work. Apropos of this last remark, it must be said in all fairness that the recently developed clinical approach to employment and personnel problems has stimulated new interest on the part of management, which may change the status of psychologists in industry.

If they are not already obvious, the reasons why psychologists enter the business research field are similar to those for doing any kind of clinical or experimental work.

1. As you will see, the problems are inherently interesting in themselves, as interesting as many reported in the current psychological literature.

2. Often the results have important economic, political or social value.

3. The rewards to the individual in satisfaction, recognition, and remuneration are equal to, if not greater than, those which accrue from work in other fields of psychological endeavor.

If you are to get a "feel" for the kinds of things these people do, the types of problems they attack, the scope of their operations, we can do no better than examine in outline a few of the projects studied by the research department of one agency during the past year. These problems are specific and representative and by no means exhaust the possibilities. Nor do they do more than indicate the ramifications of research in radio, marketing, and public opinion fields.

Examples of Jobs Done

First, it is well to know how the work is broken down into functional operations. There are three related types of investigation:

1. The application of psychological knowledge and research to the creative techniques in making effective advertising because the function of advertising is psychologic as well as economic. This includes evaluation and measurement of copy appeals, lay-out, art, and media. It tries to answer the question, "What is the most effective way to present the values in a given product so that the message will penetrate the minds of the consumer, become a part of his memory equipment, and result in persistent purchasing habits?"

2. The use of consumer survey methods to investigate product acceptance or rejection, penetration of advertising appeals, public attitudes toward business as a whole or some specific industry, opportunities for new markets, consumer buying power and preferences, readership of magazines and newspapers, and radio listening habits.

3. Library research—analysis of sales and distribution data, analysis of coverage and audiences of various media, study of the laws and regulations governing advertising, verification of claims made or to be made in ads, seeking and documenting incidents, events, personalities, and ideas to be used in advertisements. A multitude of other services, too numerous to mention, fall into this category of work.

Now to illustrate with specific examples the ways in which these types of research work out in fact. Projects "A" through "D" exemplify the first type of investigation.

Project A. You are aware of the existence of a group of magazines called the "Women's Service Books" written expressly to women. These magazines are advertised to advertisers just like any other product. Obviously the advantages in reaching a feminine audience with a product story in this type of publication, as against the general audience media, resides in the known fact that the interests, attitudes, and needs of

women are different from those of men. In order to specify and dramatize these differences, an investigation was begun to canvass known differences in interests, abilities, attitudes, and achievement between the sexes. This study necessitated a search of the biological, sociological, anthropological, and psychological literature to establish a factual basis on which an advertising campaign could be built.

Project B. An investigation of the sexual attitudes, myths, prejudices, and taboos of women members of various religious faiths and subcultures which motivate against the use of tampons for menstrual protection—accompanied by a study of the types of advertising appeals most likely to combat these resistances.

Project C. The pre and post appearance evaluation of copy appeals through the use of consumer jury tests, consumer panels, split-runs, test city campaigns, coupon returns, and readership studies.

Project D. The use of Oleo-margarine has become a war-time necessity. In order to increase the use of this product, it was necessary to discover the housewife's attitudes, both favorable and unfavorable, toward its use and translate the information into an educational campaign to change her food use habits. Because of food scarcities and rationing this process has been carried on for many products, cereals for example.

Three kinds of investigation which characterize the second type of research follow:

Project E. One of the irksome problems of logistics was the protection of ordnance and machinery from corrosive moisture during storage and shipment. The method in general use was to immerse the materials in oil or grease. This was both time consuming and expensive. Scientists, put to work to develop a more practical device, discovered a compact crystalline chemical absorbent which could be packed along with the material in a sealed plio-film envelope. It was a simple, but complete solution.

The manufacturer of this product soon realized its value for dehumidifying purposes in homes and industry. It will be among the many new products available to make our living more comfortable in the post-war era. Our problem is to discover its potential uses in home and industry. At this moment hundreds of homes in the high humidity belt are experimenting with samples of the material and will tell us what it will do, how it can be used, how they like it, where it should be sold and for how much.

Project F. The research engineer of one of our clients was asked to develop a more accurate and sturdier device for the measurement of extreme temperatures in aircraft engines. Although the method cannot

be revealed, he employed a simple electrical principle in making a new thermometer bulb which gives precision and hardiness characteristics far beyond the rigorous specifications set for it. The device may revolutionize remote temperature control. Our job is to investigate its possible uses in post-war industry, especially in the chemicals, plastics, and food processing industries, and to estimate its potential market.

Project G. Package design is an important element in the readiness with which women will buy a product. Given three different designs for a disposable tissue container submitted by a famous designer, which one will women be most likely to buy and why? Using a paired-comparison method, we asked a representative sample of women and got the answer.

As a sample of the third class of research here are two typical approaches.

Project H. War has brought many critical problems to the stocking industry. Problems of new synthetic yarns, new methods of manufacture, new styles, price control, and limitation on production. Mills have gone out of business and branded lines have lost position. These factors will have profound effects upon the structure of the business following the war. In order to prepare for any eventuality a client commissioned us to make a complete analysis of the industry covering factors effecting machinery, production, labor costs, sales, styles, and methods of distribution, pricing, merchandising, and advertising. This could all be done at a desk and is what we call library research. The resulting data, coupled with informed guesses based on experience, led to the formulation of several alternate plans or policies of operation which might be put into effect in the post-war era, depending upon the prevailing conditions.

Project I. No one had ever made a study of the economic importance and social significance of home-sewing to the life of the nation. The shortage of paper necessitated accurate information on which the government could base allocations of paper for the pattern industry, for patterns are the blue-prints, the basic tools, used in home-sewing. Exhaustive research into this problem revealed some interesting implications for the utilization of productive woman power, control of inflationary tendencies in the ready-to-wear industry, and the restraint of the cost of living for the great mass of wage earning families. We learned that more than 100 million garments were made at home during 1943, fifty-four per cent more than in 1939. That more than eighty-two per cent of all homes own sewing machines and that more than 500 million work hours were utilized in creative, useful labor, at an unbelievably small cost in paper tonnage. These facts are only a small part of the

findings. The completed report makes a tenable case for home-sewing as an important influence in the control of a war economy.

You have had a rough picture of the scope and importance of the psychologists' work in business and industry. True, some of it is far afield from applied psychology, but none of it is remote from the application of scientific methodology or the study of aspects of human economic behavior. The logical next question to be answered here concerns the training which will best fit candidates for positions in this field.

Training for Business Research

In my opinion the ideal preparation will include scientific psychology, business and economic training, and practical experience to develop special skills, in that order of importance. The formal curriculum should include experimental and social psychology, scientific method, studies in motivation and behavior, and statistical methods. Other studies to round out the program should include sociology, economics, business administration, merchandising and marketing, advertising, and the techniques of marketing and public opinion research.

Finally a program of internship study of at least one year with an independent research organization such as the Psychological Corporation or the research department of a large advertising agency. With this background the beginner will be ready for one of the many junior positions on the road to a position of major responsibility.

Post-War Opportunities

Today there is a real occupational challenge for psychologists in business and industry. They have a genuine stake in the increased role research is to play in industry's program of production for use, and the vast problem of reconversion of industry. It seems clear that the major post-war problem facing this country will be the prevention of unemployment. The solution can lie only in increased production of consumer goods, for production means employment. Similarly, production requires purchasing power and markets which employment guarantees. The development of new markets, the lifting of the American standard of living so necessary for expanding employment opportunities will present increasingly difficult, widely ramified and interesting problems for research.

Business and industry is acutely aware of this condition and is expanding its research and planning facilities to cope with it. There is a rising tide of confidence in the specific contributions psychology can make to the solution of the many dilemmas facing them. During the past few years, independent research organizations have sprung up all over

the country, some large industries have organized extensive departments of their own, while advertising agencies have expanded and strengthened their research programs to meet the needs of their clients. In the opinion of the leaders, this expansion will continue well into the period of economic readjustment.

Continued development will provide the opportunity, if the psychologists, who are best prepared to direct this work, are willing to demonstrate their interest and ability and to apply their science toward the solution of problems affecting the daily life of all of us.

Received March 29, 1944.

The Psychological Corporation Index of Public Opinion *

Henry C. Link

The Psychological Corporation, New York City

This is the eleventh in Series B of the nation-wide studies of public opinion conducted by The Psychological Corporation. Series A, generally known as the Psychological Barometer, was begun in September 1932, and is now the oldest periodic poll of public opinion and buying habits in existence. A total of 65 nation-wide surveys with 412,000 personal interviews has been made in this series which is currently being conducted quarterly with 10,000 home interviews each.

Series B was begun in September 1937 and several of the eleven surveys have been reported in this Journal. The present survey is based on 5,000 personal interviews made by 437 interviewers under the direction of 115 psychologists associated with The Psychological Corporation. The interviews were made between October 6 and 30, 1944, in 113 cities and towns representing a national cross-section of the urban population.

The exact questions used are given below, though not necessarily in their exact order. Most of the questions were asked of only half the sample, or in 2,500 interviews.

Wages and the Cost of Living

Q. "Is your family more prosperous (or better off) today than two years ago, less prosperous, or the same?"

Answers	In Oct. 1941	In Nov. 1942	In Oct. 1943	In Apr. 1944	In Oct. 1944
More prosperous	38%	29%	29%	28%	31%
About the same	47	47	46	48	46
Less prosperous	15	21	23	22	20
Don't know	—	3	2	2	3
Total interviews	2,000	2,500	2,500	2,500	2,500

In spite of the increases in the cost of living and heavier taxes, 77 per cent said they were as prosperous or more prosperous than they were two

* To conserve space and also paper further details of sampling and procedure are omitted in this report. For full details see H. C. Link, Tenth nation-wide experimental survey, *J. appl. Psychol.*, 1944, 28, 363–375. Also, to conserve space and paper only the barest explanatory comments are included with the present results. The full report may be obtained by writing to The Psychological Corporation, 522 Fifth Avenue, New York 18, New York.

years ago. This increased or equal prosperity, as will be seen from the following table, is highest among the C and D, or the large factory and wage-earning groups. In these groups, constituting about 60 per cent of the urban population, over 80 per cent admit to unimpaired prosperity. But even in the predominantly white-collar and executive groups, A and B, over 73 per cent admit to continued prosperity.

		By Socio-Econ. Groups			
October 1944	Total	A	B	C	D
More prosperous	31%	28%	27%	34%	34%
About the same	46	46	46	46	47
Less prosperous	20	24	24	18	15
Don't know	3	2	3	2	4
Total interviews	2,500	250	750	1,000	500

Labor Riots vs. Race Riots

Q. "Which do you think will happen most often in the next two years, race riots or labor riots?"

		By Socio-Econ. Groups			
Answers	Total	A	B	C	D
Labor riots	45%	44%	44%	47%	41%
Race riots	31	31	38	30	24
Neither	7	9	5	8	9
Both	3	6	2	2	3
Don't know	14	10	11	13	23

The Roots of Free Enterprise and Post-War Planning

The individual American and his family constitute the roots of free enterprise, capitalism, and post-war planning. Post-war planning, to date, has been primarily a matter of government agencies on the one hand and business organizations and groups on the other. Therefore, it was decided to devote the larger part of the present survey to a study of the post-war plans being considered by individuals. However, instead of limiting the scope of this planning to articles they were going to buy, our inquiry included the kinds of jobs they were planning to hold or to obtain, plans for education and travel, and plans for going into business for themselves.

Q. "As you know, making jobs for the returning soldiers and many others is going to be a big problem. Have you heard or read about any business organizations who are planning for post-war jobs?"

54% answered "Yes."
46% answered "No."

Q. "Have you heard or read of any planning for post-war jobs by the Government or Government bureaus?"

62% answered "Yes."
38% answered "No."

Q. "Do you think that planning by the Government and business concerns will be enough, or do you think that the head of every family and every returning soldier should also make a post-war plan of his own?"

11% thought this would be enough.
80% thought individual plans also necessary.
9% were uncertain.

Q. "Have you or the head of your family made any post-war plans? That is, have you made any plans on how you are going to use your war-time savings and bonds when the war is over?"

Answers	Total	By Socio-Econ. Groups			
		A	B	C	D
Yes	54%	50%	58%	59%	44%
No	46	50	42	41	56

Q. "(If Yes in previous question) Would you mind telling me the things you and your family are going to *do* or *buy* in the order in which you are now planning to do them?"

Answers	Total
Home, farm, bungalow	22%
Household appliances	18
Automobile	17
Furniture and furnishings	9
Trip or vacation	7
Education	7
Household repairs	6
Go into business	4
Clothes	2
Miscellaneous	13

The emphasis in most studies in this field has been on buying rather than on doing and, as a result, distorted results have usually been obtained. The distortion is an overemphasis on the purchase of movable articles as compared with such items as education, traveling, going into business, building, redecorating. For most plans some capital and spending is necessary. However, our tests proved that the emphasis on spending tends to make people answer in the other extreme, which is saving, holding on to their bonds. For these reasons surveys previously made have produced conflicting reports. Some have shown primarily the enormous purchases which people were going to make. Others have

indicated the large extent to which people were going to hold on to their savings.

Q. "Automobiles, washers, radios, houses, may be about 20 per cent higher in price when they come back. In that case would you still buy them?"

60% answered "Yes."
32% answered "No."
8% were uncertain.

Q. "(If answer was *No* in Q. 4) Why would you say you have made no plans?"

Answers	Total
Uncertain as to end of war	19%
Haven't enough bonds or savings	9
Haven't thought about it	5
Will hold bonds until maturity	4
Don't expect to need anything	4
No particular reason	3
Do not use savings to buy things	2
Total	46%

Q. "How much of the money you have saved since the war do you expect to use within a year or two after the war stops—all of it, two-thirds of it, one-third of it, or none of it?"

Of all respondents, 21 per cent said they were uncertain, while 7 per cent said they had no savings. The remainder were planning as follows:

48% planned not to spend any savings.
24% planned to spend one-third.
15% planned to spend two-thirds.
13% planned to spend all their savings.

Q. "Are you or the head of your family pretty sure of being able to keep your present job after the war?"

62% answered "Yes."
15% answered "No."
16% had their own business or profession.
7% were uncertain.

Q. "(If answer was *Yes*) Do you believe that your pay check will be as high, higher, or lower than now?"

28% answered as high.
15% answered lower.
6% answered higher.
13% were uncertain.

Q. "(If answer was *No*) If you think it likely that you will have to change from your present job into a peace-time job, are you fairly sure of getting such a job?"

8% answered "Yes."
6% answered "No."
1% were uncertain.

Q. "What are your difficulties in making a definite post-war plan for yourself or your family?"

No difficulties in planning	37%
Uncertainties of conditions after the war	30
I don't know what my job or income will be	7
I must wait for my husband or son to come home	6
Have no savings	4
Because of illness	3
Too old to plan; will retire soon	3
Miscellaneous reasons	10
Don't know; no answer	7

Q. a. "If you had your choice (or: If you were choosing for a husband or a brother) what work or occupation would you choose, after the war, of course?"

Q. b. "What are you doing now?"

Answers	Doing Now	Would Choose
Job with U. S. Government	7%	21%
Job with City or State Government	6	6
Job with large private company	25	25
Job with small private company	17	23
Own business	10	11
Professor, doctor, lawyer, teacher	7	6
In Army or Navy	9	*
Farmer	—	1
Miscellaneous, don't know, no man	19	6

* Less than .5 per cent

Received January 2, 1945.

A Method for Investigating Color Preferences in Fashions

B. R. Philip

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Most investigations of fashion preferences have been based upon questionnaires. With the exception of Jacobson's (1) work little dimensional analysis under objective conditions has been attempted in this field. To determine whether the paucity of experimental work may be ascribable, in part at least, to the difficulty of adapting modern techniques to this field, the well-known psychophysical method of ranking was applied to the study of fashion preferences. Since the dimension selected was that of color, it was proposed incidentally, and by way of exemplifying the method, to determine whether men and women differ in their fashion preferences along that dimension. As this was an exploratory study only, few subjects were used, and the statistical techniques were carried out by the methods of small sampling.

One of the chief difficulties in an experimental study of fashion is the selection and presentation of the material. Obviously each subject must have ample opportunity to observe the material under the same standard conditions as every other subject. Were all observations made upon actual costumes, it is probable that other factors would tend to obscure the real facts, and validity would be secured at the expense of other qualities. Some procedure must be found to condense the material, to shorten the observation time and to equate observational conditions for all subjects.

Fortunately, instead of actual costumes, colored reproductions may be substituted with some confidence in the validity of the findings. People are accustomed to study fashions in this way, and often have recourse to pictures of garments to make their actual selections when purchasing clothes. One could proceed with much greater confidence if published experimental studies gave actual validity findings. To our knowledge, none have appeared in the literature. An unpublished study of the author, based on data from 19 men and 24 women in one group, and later, from 56 men and 106 women in another group, yielded average correlations of 0.85 for the men and 0.95 for the women, between preferences for actual material (Scotch plaid scarves), and colored pictures projected on a screen of these same scarves, when both rank order and paired comparison methods were employed. Accordingly it was decided

to use colored fashion plates in lieu of actual costumes. In order to make sure that these costumes were in fashion, they were all selected from *Vogue*, for the current year, 1941, when this work was done.[1]

The material finally selected consisted of five sets of colored fashion plates. Each set consisted of 25 cards, all of the same size and showing one costume, commonly known as an afternoon dress; the costumes differed from card to card in some details, such as cut, ornamentation, etc. Within a set the costumes were of five different predominating colors, Black or Gray, Green, Blue, Red and Brown. There were five cards of each color, which differed considerably in hue, saturation and intensity; they were mostly monotone, although a few were striped or mottled. The sets differed among themselves in the height of the figure, which varied as follows: Set A, 11 inches; sets B and C, 9 inches; and sets D and E, 7 inches. The figures were cut out in silhouette and mounted individually on white cardboard, so as to leave an ample margin. Thus the size of the card in set A was $14\frac{1}{2} \times 8$ inches, and in sets D and E, $8\frac{1}{2} \times 5$ inches. A small code letter at the top of each card was inserted to permit of ready identification.

In the coding the sequence of colors was always the same, Black or Gray, Green, Blue, Red and Brown. Thus the letters, *a*, *f*, *k*, *p*, and *u* always designated a Black or Gray card, and *b*, *g*, *l*, *q*, and *v*, a Green card. This coding system was intended to permit easy segregation of the colors in tabulation. However in the actual experiment the cards were always presented in random order to the Ss, no one of whom noticed or understood the system used in coding.

The procedure was simple. College students, 19 men and 9 women, were given a set of cards randomly arranged to lay out, in order of preference, on a long table. They were provided with a set of typed instructions as follows:

> Rank the following set of cards according to preference, placing the card you most prefer in number one position, and placing the card you least prefer in the last (25th) position. Ratings are to be based upon general preference; all factors being taken into account. The question to be answered is simply, "Which outfit do you prefer?" No ties are allowed, but the cards may be shifted in position as often as preferred. Work quickly, and do not delay too long over any choice.

The sets were presented to the subjects in random order to equalize practice effects on the judgments of the various sets. All the rankings were entered on specially prepared tabulation sheets. One set only was ranked by every subject at the experimental sessions, which occurred bi-weekly. The purpose of spacing the experimental sessions was to

[1] Acknowledgment is here made to the Conde Nast Publications for supplying this material.

minimize the "halo effect" and fatigue or boredom. To determine test-retest reliabilities, some six weeks after the ranking of the fifth set, the experiment was repeated for the women; the men were not available for this phase of the experimentation. By this procedure it was hoped that indications might be found whether or not there would be any time trend in the fashion preferences, while the costumes were still in fashion.

Results

The data were treated separately for men and for women. Linear scale values were computed by Guilford's method (2) assuming a composite standard based on the group of stimuli within the set, as a whole. Scale values were used rather than mean rankings in order to evaluate the dispersions of the judgments of one set as compared with another. The scale values in each set were then totalled for each group of colors, to form a five by five table of colors vs. sets, which was subjected to analysis of variance. As a check on the procedure, an analysis of variance using total ratings rather than scale values yielded substantially the same findings.

A point of some importance in this type of material is to determine how consistently the rankings are made by the individual and by the group. The degree to which the members of a group agree in their rankings may be inferred from the average intercorrelations of the rankings on any one set of cards. These intercorrelation values as determined by Kelly's formula, number 172, (3), and listed in Table 1, are positive and low, and average 0.220 for the women, and 0.134 for the men.

Table 1

Intercorrelations of Ratings from Different Sets of Cards

Set	Men	Women First Rating	Women Second Rating
A	0.169	0.203	0.153
B	0.135	0.267	0.175
C	0.135	0.327	0.327
D	0.095	0.171	0.204
E	0.136	0.137	0.243
Mean	0.134	0.221	0.220

The reliability of the individual rankings for the women, from a retest after six weeks, based on the correlations of the first and the second rankings of a set by the same individual, is relatively high, since an average reliability of 0.593 is found from all five sets (Table 2). Since the complete experiment is based on the rankings of five sets, were we

Table 2

Average Test-Retest Reliabilities for Women

Set	Per Subject	Per Card
A	0.644	0.891
B	0.608	0.835
C	0.553	0.885
D	0.594	0.700
E	0.566	0.813
Mean	0.593	0.825

to estimate the test reliability by applying the Spearman-Brown formula, the correlation becomes 0.879.

This is an average test-retest reliability *per subject;* but the average test-retest reliability may also be determined *per card.* It is obtained by correlating, by the rank-difference method, the total rating scores per card, yielded by the first and second ratings. This procedure is, in effect, a measure of the reliability of the group. These reliabilities are also presented in Table 2, from which it is seen that the average test-retest reliability *per card* is 0.825, which, when stepped up by the Spearman-Brown formula, becomes 0.959.

Accordingly the test employed is of satisfactory reliability, yielding fairly consistent results for the same individual, although individuals differ considerably among themselves in their preferences for any particular costume. Furthermore, after a lapse of six weeks, the group judgments are more consistent than the judgments of an individual. It is chiefly the reliability values found that give some confidence in the technique as here outlined for the investigation of fashions.

Since the experimental set-up was designed to investigate fashion preferences along a dimension of color by analysis of variance, it seemed of interest to do so, although it was recognized that the very small number of subjects would make any conclusions only very tentative and exploratory. The results are presented with this caution in mind, and are of course, only applicable to this group of subjects.

Analysis of variance discloses that the color of the costume is a statistically significant factor in the fashion preference for the men, but not for the women, in this experiment. For significance at the 1% and 5% level and with appropriate degrees of freedom, $F = 4.77$ and 3.01 respectively; the F values obtained were 18.63 and 2.26 for men and women respectively.

In order of preference the colors for the men were Blue, Black, Green, Red and Brown. The preferences for Blue were significantly greater at

the 1% level than those for Green, Red and Brown; for Black, significantly greater at the 1% level than those for Red and Brown; and for Green, significantly greater than for Brown at the 5% level. As was stated, color preferences for the women are not statistically significant, but the order of preference was Green, Blue, Red, Brown and Black. Mean linear scale values, assuming a composite standard, are given in Table 3. This table implies that Blue costumes were on the average

Table 3

Mean Linear Scale Values for Colors

	Black	Green	Blue	Red	Brown
Men	0.132	−0.011	0.259	−0.161	−0.191
Women	−0.124	0.145	0.122	−0.069	−0.117

assigned by the men a scale position 0.259 standard deviation times higher than the mean rankings of all the cards in a set. Here the positive sign indicates a more favorable preference than the average.

One might also determine the tendency to make preferred judgments for the colors by noting the percentage of times the various colors were given scale values greater than the mean scale value in each set. These percentages are given in Table 4, which confirms, in general, the findings based upon mean scale values.

Table 4

Percentages of Frequency of Preferred Selections for the Various Colors

	Black	Green	Blue	Red	Brown
Men	68	44	76	32	32
Women	48	68	56	48	36

The men are more prone to group around the mean judgments of costumes that have no marked positive or negative appeal; the women show greater dispersion of all judgments. Thus the relative proportions of judgments with scale values plus or minus 0.2 standard deviations from the mean, are 54% for the men, and 35% for the women; and for scale values plus or minus 0.4 standard deviations from the mean, 81% for the men and 67% for the women.

Since such a high proportion of cards were grouped about the mean, the implication is that no clear-cut preferences exist for many of the costumes, and definite preferences or rejections exist only for cards ranked in extreme positions. A listing of such preferences is given in Table 5, where the order of the color of the five most preferred costumes

Table 5

Distribution of First Five and Last Five Choices per Set According to Color

	First Choices					
	Black	Green	Blue	Red	Brown	Total
Men	8	2	11	3	1	25
Women, I	3	4	11	5	2	25
Women, II	4	4	11	4	2	25
	Last Choices					
	Black	Green	Blue	Red	Brown	Total
Men	2	—	1	10	12	25
Women, I	7	3	3	6	6	25
Women, II	7	2	3	7	6	25

The distribution of the choices for the first and for the second ratings are listed along the rows Women I and Women II.

per set corresponds quite well, for the men, but not for the women, with the linear scale values.

In the preferential positions the men in our experiment select Blue first and Black next, and in a decided manner they show least preferences for Brown and Red. The women also select Blue most frequently in the preferential positions, with the other colors occurring in about equal frequency. They are prone to spread their least preferred judgments among all the colors, with an indication of lesser allotment in those positions to Green and Blue. Green is the favorite choice for the women when all the cards are considered, as may be seen from the listing of the mean scale values, and from the percentages of preferred selections, although it does not receive as many preferred choices as does Blue. A point of interest is the close agreement of the first and second ratings of the women, confirming the reliability values found.

In summary we may state that this technique of investigating fashions is of adequate reliability. With the caution that this investigation has been carried out with few subjects, and that factors other than color such as style and pattern were not controlled, there are indications that the men place considerable emphasis on color in their rankings, Blue being the favorite color and Black the next. The women base their selections on a very composite criterion, as was pointed out by Hurlock (4) and by Barr (5), but Blue is for them also a favorite color, ranking slightly after Green. However their color preferences are subordinate to other factors in costume selection, and in this investigation were not statistically reliable. It is of interest to note that the colors selected for this investigation are the five most preferred colors as found by Barr (5)

from her questionnaire, and the order of preference is closely the same in both investigations.

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Test Profiles as a Diagnostic Aid: The Minnesota Multiphasic Inventory

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The purpose of this paper is to present some findings in the use of the Minnesota Multiphasic Personality Inventory in a clinical situation.

No attempt will be made here to describe the development of the test, nor its applicability as a clinical instrument since these have been described elsewhere by its authors (1, 2, 3, 4, 5, 6, 7), by Leverenz (8), and by Schiele, Baker and Hathaway (9).

The test consists of 550 items printed upon cards. The subject is asked to file these cards into any one of three categories: *True*, *False*, *Cannot Say*. The test contains 12 scales: 3 validating scales, *Question* (cannot say), *Lie* and *False;* and 9 diagnostic categories: Hypochondriasis (H_s), Depression (D), Hysteria (H_y), Psychopathic Deviate (P_d), Masculinity-Femininity (M_f), Paranoia (P_a), Psychasthenia (P_t), Schizophrenia (S_c) and Hypomania (M_a).

The data have been gathered over a period of 9 months from cases studied in the Consultation Service of an Air Force replacement pool.

Procedure

The Multiphasic Inventory was administered as prescribed in the manual of directions (6). It was given in so far as practicable as part of the routine on the opening of a case. However, the pressure of time and the lack of sufficient test sets precluded the possibility of testing all cases coming to the Service.

All diagnoses were made by qualified neuropsychiatrists, employing classifications in common use in the Army, which in the main follow civilian practice.

This was not a controlled experiment, in the sense that careful selection of normal cases was sought, or that pure-culture clinical groups were (or could be) employed. Yet, there is reasonable certainty that the test did not influence the clinical diagnosis. Three of the four neuropsychiatrists making diagnoses avoided the test, merely finding it interesting *a postiori* that it seemed to agree with the clinical findings. The fourth neuropsychiatrist was quite interested in the test, but with a view to assisting in this validity study, he was careful not to see or to discuss

the test on a particular individual until *after* he had made his clinical judgment.[1]

The Subjects

The subjects were all white male enlisted members of the Army Air Forces. The clinical groups had been referred to the Consultation Service because of difficulty in adjusting to the Army situation. The normal group was being re-evaluated, either because its records had become lost, were incomplete, or because there existed overages in particular occupational specialties, making reclassification necessary.

The deviate groups consisted of 121 subjects who fell into the diagnostic categories: constitutional psychopathic state, inadequate personality; constitutional psychopathic state, sexual psychopathy; psychoneurosis, mild; psychoneurosis, severe; and psychosis. There were several other groups, such as Organics, Simple Adult Maladjustment, Alcoholics, etc., but the cases were too few to have statistical significance and are not included here for that reason. Clinically, they were differentiable by profile. Table 1 gives descriptive data on the various groups as to number, age, intelligence, years of schooling, months of service, marital status, rank, number of states represented, population of the home town, and final disposition of the men who had been studied. This latter column consists of a percentage computation into 5 categories: discharge from the military service; limited military duty; full field duty; hospitalization (in most cases general hospital is implied) and duty (?). The last named category comprised those men on whom the follow-up data were incomplete, the only thing being known was that they were returned to duty, but whether on a full or limited duty status could not be ascertained.

The normal group N_o[2] consisted of 98 subjects, who upon inquiry manifested no evidence of overt or covert personality disorder. Their civilian and Army histories were devoid of any indication of disturbance: some had been overseas, but in a quiet theater; some had "washed-out" as aviation cadets, primarily for lack of psychomotor adaptability; but no trauma could be detected subjectively as attending either of these major sources of normal cases.

In all groups, by inspection, the descriptive data (Table 1) appeared to have a normal distribution generally and to be comparable. How-

[1] I should like to acknowledge here my indebtedness to 1st Lt. Roland A. Leslie, MC, for assistance and inspiration as a fellow-worker and in the preparation of this paper.

[2] Hereafter the symbols N_o, C_p, C_H, P_m, P_s and P_{sy} will be used to designate the normal group; CPI, inadequate; CPI, sexual psychopathy; mild neurotics, severe neurotics and psychotic groups, respectively.

Table 1

Descriptive Data for the Normal Group (N_o) and the Constitutional Psychopathic State, Inadequate Personality (C_p), Constitutional Psychopathic State, Sexual Psychopathy (C_H), Psychoneurosis, Mild (P_m), Psychoneurosis, Severe (P_s), and Psychotic (P_{sy}) Groups

	Age (yrs.)			Education (yrs. comp.)			Service (months)			A.G.C.T.			Rank		Mar. Stat.		No. State Rep.	Pop. in 1000's		Disch. NFS FFD H Dy?
	$\bar{x}$	s	Range	$\bar{x}$	s	Range	$\bar{x}$	s	Range	$\bar{x}$	s	Range								
													M/Sgt.	9						
n, 98													T/Sgt.	24						
													S/Sgt.	16	M	50		0–1	18	
N_o	24.9	3.5	18–36	11.7	1.6	8–17	38.3	27.8	10–204	114.3	12.0	78–139	Sgt.	17	S	47	34	1–10	22	100%
													Cpl.	11	D	1		10–100	33	
													Pfc.	5				100	25	
													Pvt.	16						
																				27.3
n, 11													Pvt.	8				0–1	1	9.1
C_p	24.4	3.6	20–31	11.0	2.7	6–15	22.8	27.9	4–108	105.7	17.5	75–128	Cpl.	2	S	8	6	1–10	1	—
													Sgt.	1	M	3		10–100	2	9.1
																		100	7	54.5
n, 7													Pvt.	3				0–1	0	85.7%
													Pfc.	1	S	6		1–10	0	—
C_H	27.3	6.4	20–40	12.9	3.4	8–18	11.1	8.3	4–30	105.2	16.1	74–121	Cpl.	1	M	1	5	10–100	1	—
													Sgt.	2				100	6	—
																				12.3%
n, 26													Pvt.	6						7.7
													Pfc.	9	S	13		0–1	4	19.3
P_m	24.6	4.5	19–37	11.5	2.3	8–19	12.7	10.6	4–54	117.6	15.7	76–142	Cpl.	5	M	13	16	1–10	3	3.8
													Sgt.	4				10–100	6	—
													S/Sgt.	1				100	13	69.2
													T/Sgt.	1						
n, 64													Pvt.	27						50.0
													Pfc.	16	S	34		0–1	6	21.9
P_s	24.7	4.5	19–36	11.3	1.8	3–19	13.9	10.5	2–42	108.4	21.3	74–145	Cpl.	8	M	30	27	1–10	8	9.4
													Sgt.	8				10–100	11	4.7
													S/Sgt.	3				100	39	14.0
													T/Sgt.	2						
n, 13																				53.8
													Pvt.	5	S	8		0–1	1	7.7
P_{sy}	24.9	5.5	19–34	10.4	1.9	6–13	26.7	38.7	3–144	108.2	11.9	86–129	Pfc.	6	M	4	10	1–10	2	15.4
													T/Sgt.	2	D	1		10–100	5	7.7
																		100	5	15.4

ever, the intellectual distribution is skewed somewhat to the left, in that no Army General Classification Test group V's were given the test. This was because of the highly questionable ability of this low group to comprehend the various test items.

Results

Figures 1–5 show graphically the T-score profiles of the C_p, C_H, P_m, P_s and P_{sy} clinical groups together with the N_o group.

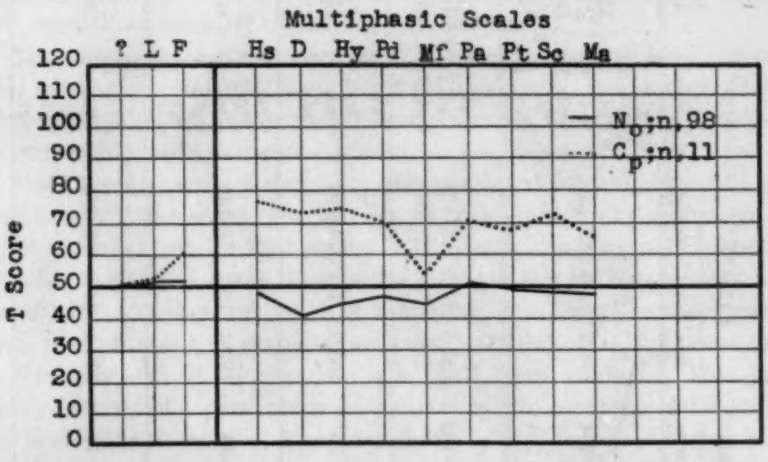

FIG. 1. T-score profiles on the Multiphasic Inventory for the Normal (N_o) and constitutional psychopathic state, inadequate personality (C_p) groups.

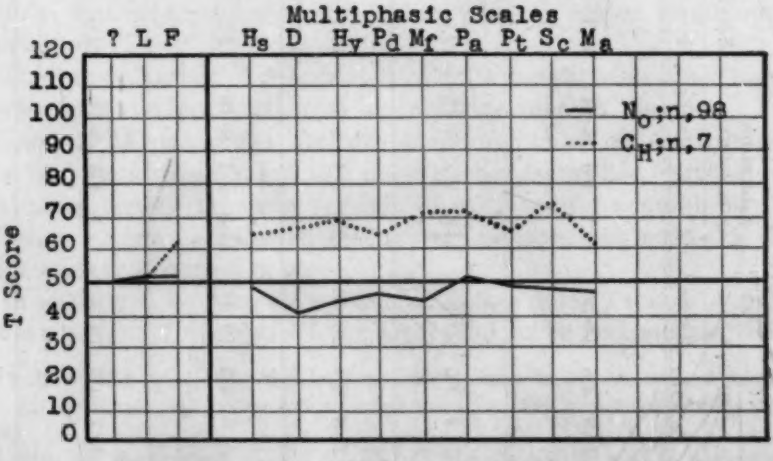

FIG. 2. T-score profiles on the Multiphasic Inventory for the Normal (N_o) and constitutional psychopathic state, sexual psychopathy (C_H) groups.

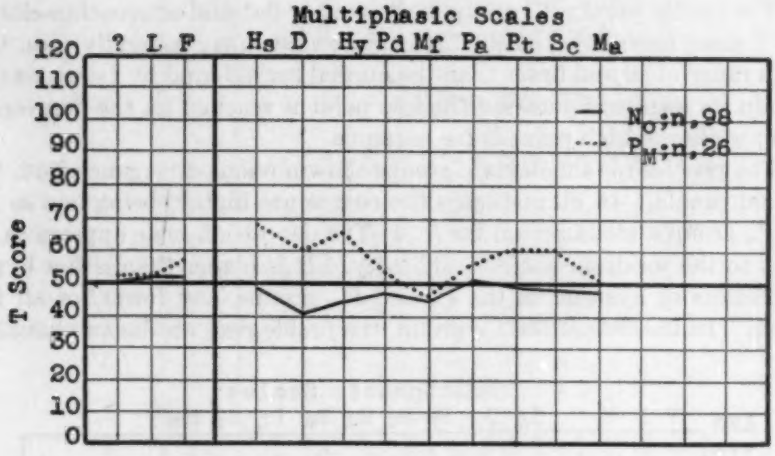

FIG. 3. T-score profiles on the Multiphasic Inventory for the Normal (N_o) and psychoneurosis, mild (P_m) groups.

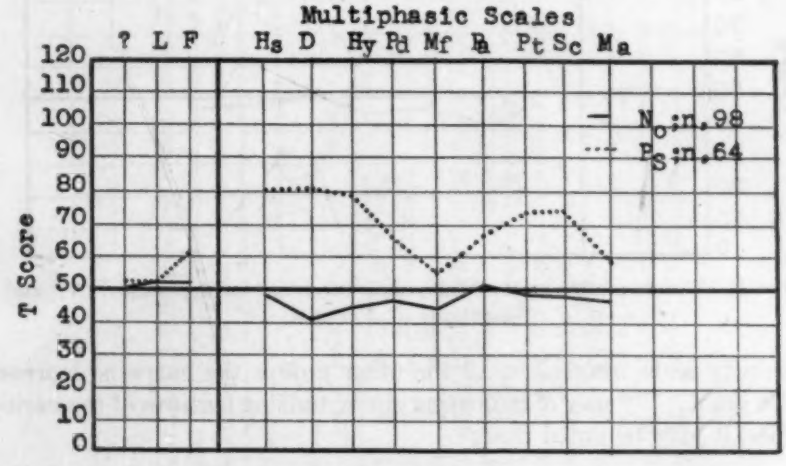

FIG. 4. T-score profiles on the Multiphasic Inventory for the Normal (N_o) and psychoneurosis, severe (P_s) groups.

Table 2 presents the means, sigmas and ranges of all groups; and Tables 3, 4, 5, 6 and 7 give the differences, standard errors of difference and critical ratios between the various groups (T-score values, uncorrected for small samples or beyond 1 decimal point).

It is at once apparent from inspection of Figures 1–5 that the deviate groups present different and characteristic profiles from those made by the normal group.

The profile for the N_o group is reasonably flat and approaches closely the T-score mean level of 50. It is somewhat lower generally than this mean range of 50 and lower than the normal curve found by Leverenz (8). Within its own configuration the low point is reached on the depression scale; while the high point is for paranoia.

The profiles for the deviate groups show obvious divergence from the normal profile. In all instances the curves are higher, being less so for the P_m group and maximum for P_{sy}. The depression scale appears as an index to the seriousness of the difficulty. It is higher than either hypochondriasis or hysteria in the P_s and P_{sy} groups, and lower for all the others. In the case of the C_H group, the profile rises on the masculinity-

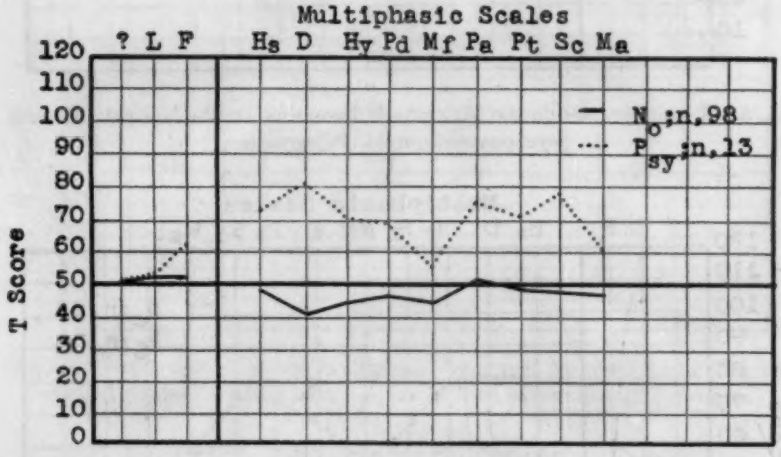

FIG. 5. T-score profiles on the Multiphasic Inventory for the Normal (N_o) and psychosis (P_{sy}) groups.

femininity scale whereas in all the other groups the curve is depressed at this point. By way of indicating characterizing features of the various profiles, it may be noted that:

(*a*) The N_o profile, although generally a straight line at T-score mean level, shows a low-point at depression and a high-point at paranoia;

(*b*) The C_p curve has high points about 2 sigmas above mean level through the psychopathic deviate scale, drops to nearly normal at masculinity-femininity, rises to paranoia, drops again slightly on psychasthenia, rises to schizophrenia and falls off on hypomania;

(*c*) The C_H profile is approximately a straight line, between 1 and 2 sigmas above the mean level, with high-points on the masculinity-femininity and schizophrenia scales;

(*d*) The P_m profile, at about 1 sigma above normal, descriptively shows a high level at hypochondriasis-depression-hysteria (depression lowest), dropping sharply on masculinity-femininity and rising sharply again to psychasthenia-schizophrenia;

Table 2

T-Score Means, Standard Deviations and Ranges for the Normal Group (N_o), Constitutional Psychopathic State, Inadequate Personality (C_p), Constitutional Psychopathic State, Sexual Psychopathy (C_H), Psychoneurosis, Mild (P_m), Psychoneurosis, Severe (P_s), and Psychotic (P_{sy}) Groups, on the Separate Scales of the Minnesota Multiphasic Inventory

	N_o n, 98			C_p n, 11			C_H n, 7			P_m n, 26			P_s n, 64			P_{sy} n, 13		
	$\bar{x}$	s	Range	$\bar{x}$	s	Range	$\bar{x}$	s	Range	$\bar{x}$	s	Range	$\bar{x}$	s	Range	$\bar{x}$	s	Range
?	50.1	.5	50–53	51.7	4.1	50–64	50.0	0.0	—	51.9	5.9	50–80	51.1	4.6	50–80	50.8	2.7	50–60
L	52.1	3.5	50–63	52.8	3.1	50–60	50.0	0.0	—	51.7	4.1	50–70	51.9	4.0	50–66	52.5	6.9	50–76
F	52.2	4.1	50–68	61.0	9.1	50–80	61.7	8.1	50–80	56.9	8.1	50–80	60.9	9.9	50–80	63.0	10.8	50–80
H_s	48.5	8.2	40–90	77.1	18.6	47–117	65.7	11.4	42–85	69.9	16.0	47–99	80.3	15.9	40–108	74.6	16.2	53–106
D	41.2	12.7	29–96	73.7	19.3	41–99	66.6	12.4	29–82	60.6	21.4	29–94	80.7	20.8	39–120	82.1	27.5	32–116
H_y	45.1	10.0	35–89	75.1	20.4	40–100	69.0	12.9	47–93	66.6	19.7	35–106	79.3	15.6	49–109	70.6	20.0	35–111
P_d	47.0	13.1	25–86	71.0	17.9	30–96	66.4	16.1	35–86	53.2	14.9	32–101	66.3	17.1	32–106	69.4	23.2	20–111
M_f	45.2	9.7	26–73	54.4	10.7	37–76	71.4	17.2	44–94	46.9	11.5	28–74	56.5	11.1	35–102	55.5	13.9	37–78
P_a	51.0	8.9	33–79	71.5	14.7	47–102	71.4	8.4	44–85	56.0	14.4	33–85	66.2	11.6	38–114	76.2	25.1	38–117
P_t	49.5	8.4	38–78	68.0	14.4	45–89	66.3	9.5	45–77	60.5	14.9	39–93	72.9	12.7	45–95	71.9	15.7	42–98
S_c	48.5	7.7	38–71	72.6	19.9	45–105	74.7	12.6	45–90	60.7	15.1	40–103	73.6	15.9	43–106	78.5	18.6	45–114
M_a	48.2	9.4	30–75	66.6	12.4	43–86	61.0	8.9	45–70	50.4	12.1	30–72	59.5	11.5	34–88	61.5	13.5	30–84

Table 3

Comparison of the Normal Group (N_o) and the Clinical Groups of Constitutional Psychopathic State, Inadequate Personality (C_p),Constitutional Psychopathic State, Sexual Psychopathy (C_H), Psychoneurosis, Mild (P_m), Psychoneurosis, Severe (P_s), and Psychosis (P_{sy}) on the Separate Multiphasic Inventory Scales Showing Difference, Standard Error of Difference and Critical Ratio of T-scores*

N_o n, 98	P_m n, 26														
C_p n, 11	P_s n, 64	N_o–C_p			N_o–C_H			N_o–P_m			N_o–P_s			N_o–P_{sy}		
C_H n, 7	P_{sy} n, 13	Dif.	$SE_{dif.}$	$D/SE_{dif.}$	Dif.	$SE_{dif.}$	$D/SE_{dif.}$	Dif.	$SE_{dif.}$	$D/SE_{dif.}$	Dif.	$SE_{dif.}$	$D/SE_{dif.}$	Dif.	$SE_{dif.}$	$D/SE_{dif.}$
?		1.6	1.2	1.3	− .1	.05	2.0	.8	1.1	.7	1.1	.6	.2	.7	.7	1.0
L		.7	1.0	.7	−2.1	.3	7.0	−.4	.9	.4	−.2	.6	.3	.4	1.6	.3
F		8.8	2.8	3.1	9.5	3.7	2.6	4.7	1.6	2.9	8.7	1.3	6.7	10.8	3.0	3.6
H_s		28.6	5.7	5.0	17.2	4.4	3.9	21.4	3.2	6.7	31.8	2.1	15.1	26.1	4.5	5.8
D		32.5	5.9	5.5	25.4	4.9	5.2	19.4	4.4	4.4	39.5	2.9	13.6	40.9	7.8	5.2
H_y		30.0	6.2	4.8	23.9	4.9	4.9	21.5	3.9	5.5	34.2	2.2	15.5	25.5	5.6	4.6
P_d		24.0	5.5	4.4	19.4	6.2	3.1	6.2	3.2	1.9	19.3	2.5	7.7	22.4	6.6	3.4
M_f		9.2	3.3	2.8	26.2	6.6	4.0	1.7	2.5	.7	11.3	1.7	6.6	10.3	3.9	2.6
P_a		20.5	4.5	4.6	20.4	3.3	6.2	5.0	2.9	1.7	15.3	1.7	9.0	25.2	7.0	3.6
P_t		18.5	4.4	4.2	17.8	3.7	4.8	11.0	3.0	3.7	23.4	1.8	13.0	22.4	4.4	5.1
S_c		24.1	6.1	3.9	26.2	4.8	5.5	12.2	3.1	3.9	25.1	2.1	12.0	30.0	5.2	5.8
M_a		18.4	3.8	4.8	12.8	3.5	3.7	2.2	2.5	.9	11.3	1.7	6.6	13.3	3.8	3.5

* Difference is first of a pair from second; hence, minus signs may occur.

Table 4

Comparison of the Constitutional Psychopathic State, Inadequate Personality Group (C_p) and the Clinical Groups of Constitutional Psychopathic State, Sexual Psychopathy (C_H), Psychoneurosis, Mild (P_m), Psychoneurosis, Severe (P_s), and Psychosis (P_{sy}) on the Separate Multiphasic Inventory Scales Showing Difference, Standard Error of Difference and Critical Ratio of T-scores*

C_p n, 11	P_s n, 64											
C_H n, 7	P_{sy} n, 13	C_p–C_H			C_p–P_m			C_p–P_s			C_p–P_{sy}		
P_m n, 26		Dif.	$SE_{dif.}$	$D/SE_{dif.}$	Dif.	$SE_{dif.}$	$D/SE_{dif.}$	Dif.	$SE_{dif.}$	$D/SE_{dif.}$	Dif.	$SE_{dif.}$	$D/SE_{dif.}$
?		−1.7	1.2	1.4	.2	1.7	.1	− .6	1.3	.5	− .9	1.5	.6
L		−2.8	.9	3.1	−1.1	1.2	.9	− .9	1.1	.8	− .3	2.1	.1
F		.7	4.1	.2	−4.1	3.2	1.3	.8	3.0	.3	2.0	4.1	.5
H_s		−11.4	7.1	1.6	−7.2	6.4	1.1	2.2	5.9	.4	−2.5	7.2	.3
D		−7.1	7.4	1.0	−13.1	7.2	1.8	7.0	6.3	1.1	8.4	9.6	.9
H_y		−6.1	7.7	.8	−8.5	7.2	1.2	4.2	6.4	.7	−4.5	8.2	.5
P_d		−4.6	8.1	.6	−17.8	6.1	2.9	−4.7	5.8	.8	−1.6	8.4	.2
M_f		17.0	7.2	2.4	−7.5	3.9	1.9	2.1	3.5	.6	1.1	5.0	.2
P_a		− .4	5.4	.1	−15.5	5.2	2.9	−5.2	4.6	1.1	4.7	8.2	.6
P_t		−1.7	5.6	.3	−7.5	5.2	1.4	4.9	4.6	1.1	3.9	5.9	.7
S_c		2.1	7.7	.3	−11.9	6.7	1.8	1.0	6.3	.2	5.9	7.9	.7
M_a		−5.6	5.0	1.1	−16.2	4.4	3.7	−7.1	4.0	1.8	−5.1	5.0	1.0

* Difference is first of a pair from second; hence, minus signs may occur.

Table 5

Comparison of Constitutional Psychopathic State, Sexual Psychopathy (C_H), and the Clinical Groups of Psychoneurosis, Mild (P_m), Psychoneurosis, Severe (P_s), and Psychosis (P_{sy}) on the Separate Multiphasic Inventory Scales Showing Difference, Standard Error of Difference and Critical Ratio of T-scores*

C_H n, 7 / P_m n, 26	P_s n, 64 / P_{sy} n, 13	C_H–P_m			C_H–P_s			C_H–P_{sy}		
		Dif.	$SE_{dif.}$	$D/SE_{dif.}$	Dif.	$SE_{dif.}$	$D/SE_{dif.}$	Dif.	$SE_{dif.}$	$D/SE_{dif.}$
?		1.9	1.1	1.7	1.1	.5	2.2	.8	.8	1.0
L		1.7	.8	2.1	1.9	.5	3.8	2.5	1.6	1.6
F		−4.8	3.4	1.4	− .8	3.3	.2	1.3	4.2	.3
H_s		4.2	5.3	.8	14.6	4.7	3.1	8.9	6.2	1.4
D		−6.0	6.3	1.0	14.1	5.4	2.6	15.5	8.9	1.7
H_y		−2.4	6.2	.5	10.3	5.3	1.9	1.6	7.3	.2
P_d		−13.2	6.8	1.9	− .1	6.4	.2	3.0	8.9	.3
M_f		−24.5	6.9	3.6	−14.9	6.7	2.2	−15.9	7.6	2.1
P_a		−15.4	4.2	3.7	−5.1	3.5	1.5	4.8	7.6	.6
P_t		−5.8	4.6	1.3	6.6	3.9	1.7	4.6	5.6	.8
S_c		−14.0	5.6	2.5	−1.1	5.1	.2	3.8	7.0	.5
M_a		−10.6	4.1	2.6	−1.5	3.8	.4	.5	5.0	.1

* Difference is first of a pair from second; hence, minus signs may occur.

Table 6

Comparison of psychoneurosis, mild (P_m), and the clinical groups of psychoneurosis, severe (P_s), and psychosis (P_{sy}) on the separate Multiphasic Inventory scales showing difference, standard error of difference and critical ratio of T-scores*

P_m n, 26 / P_s n, 64 / P_{sy} n, 13	P_m–P_s			P_m–P_{sy}		
	Dif.	$SE_{dif.}$	$D/SE_{dif.}$	Dif.	$SE_{dif.}$	$D/SE_{dif.}$
?	−.8	1.3	.6	−1.1	1.4	.8
L	.2	.9	.2	.8	2.1	.4
F	4.0	2.0	2.0	6.1	3.4	1.8
H_s	11.4	3.7	3.1	4.7	5.5	.9
D	20.1	4.9	4.1	21.5	8.7	2.5
H_y	12.7	4.3	3.0	4.0	6.8	.6
P_d	13.1	3.6	3.6	16.2	7.1	2.3
M_f	9.6	2.7	3.6	8.6	4.4	1.9
P_a	10.3	3.3	3.1	20.2	7.5	2.7
P_t	12.4	3.3	3.8	10.4	5.2	2.0
S_c	12.9	3.6	3.6	17.8	5.9	3.0
M_a	9.1	2.8	3.3	11.1	4.4	2.5

* Difference is first of a pair from second; hence, minus signs may occur.

Table 7

Comparison of psychoneurosis, severe (P_s), and the clinical group of psychosis (P_{sy}) on the separate Multiphasic Inventory scales showing difference, standard error of difference and critical ratio of T-scores*

P_s n, 64 / P_{sy} n, 13	P_s–P_{sy}		
	Dif.	$SE_{dif.}$	$D/SE_{dif.}$
?	− .3	.9	.3
L	.6	1.9	.3
F	2.1	3.2	.7
H_s	−5.7	4.9	1.2
D	1.4	8.1	.2
H_y	−8.7	5.9	1.5
P_d	3.1	6.8	.5
M_f	−1.0	4.4	.2
P_a	9.9	7.1	1.4
P_t	−1.0	4.6	.2
S_c	4.9	5.5	.9
M_a	2.0	4.0	.5

* Difference is first of a pair from second; hence, minus signs may occur.

(*e*) The P_s curve shows a high plateau, 3 sigmas above normal at hypochondriasis-depression-hysteria (depression slightly higher), drops at masculinity-femininity, and rises again to schizophrenia;

(*f*) The P_{sy} profile shows a high peak on depression at 3 sigmas above normal, a descending to masculinity-femininity to nearly normal, a sharp rise (2.5 sigmas) to paranoia, a slight drop at psychasthenia and a rise to nearly 3 sigmas at schizophrenia.

There is a decrease on all profiles on the hypomania scale.

Of the validating indicators, ?, L and F, the curve rises more sharply at F for the P_{sy} group and has minimal accentuation for N_o.

From examination of Table 3, where the N_o group is compared with the clinical groups, C_p, C_H, P_m, P_s and P_{sy}, it will be noted that in all but 6 instances a significant difference is apparent, the critical ratio being 3.1 or higher—ranging from 3.1 for N_o–C_H on the P_d scale to 15.5 for N_o–P_s on the H_y scale.[3] Of the 6 cases that diverge, 4 are in the N_o–P_m comparison on the psychopathic deviate, masculinity-femininity, paranoid and psychasthenic scales, with critical ratios of 1.9, .7, 1.7 and .9 respectively. The remaining 2 are on the masculinity-femininity scale for N_o–C_p and N_o–P_{sy}, with critical ratios of 2.8 and 2.6 respectively.

In the matter of the validating items of ?, L and F scales, no significant differences appear on the ? scale, although between N_o–C_H the critical ratio is 2.0, the N_o group having the higher ? score. On the L scale, the only difference possessing significance is that between N_o–C_H, where the critical ratio is 7.0, and where again the N_o group makes the higher score. The F scale shows significant differences in 3 of the comparisons, and borderline significance in the remaining 2. In each instance the greater F score is made by the clinical group. The critical ratios in ascending order are respectively: N_o–C_H, 2.6; N_o–C_p, 3.1; N_o–P_{sy}, 3.6, and N_o–P_s, 6.7.

Table 4 compares the C_p group with the other clinical groups. In only 2 instances here are there significant differences: the L scale has a critical ratio of 3.1 for C_p–C_H, the C_p score being the higher; and the critical ratio for C_p–P_m on hypomania is 3.7, the C_p score being higher. Approaching significance is the critical ratio of 2.4 for C_p–C_H on the masculinity-femininity scale, the C_H group being the higher; C_p–P_m on the psychopathic deviate scale shows a critical ratio of 2.9, the C_p group being higher; and on the paranoid scale, C_p–P_m, the critical ratio is 2.9, C_p being the higher.

Table 5 compares the C_H group with the clinical groups P_m, P_s and P_{sy}. In the validating scales, only the L score for C_H–P_s shows a difference that is significant—the critical ratio is 3.8, with C_H being higher.

[3] In this and succeeding discussion of significance, a critical ratio of 3.0 is taken as the criterion for significance.

On the masculinity-femininity and paranoia scales for C_H–P_m, and hypochondriasis on C_H–P_s the critical ratios are respectively 3.6, 3.7 and 3.1, with C_H higher in the first 2 instances, and the lower score in the latter. These are the only significant differences here; but noteworthy are: critical ratios of 2.5 and 2.6 for C_H–P_m on the schizophrenia and hypomanic scales respectively, with C_H in each case the higher score; in the C_H–P_s comparison we find the respective critical ratios of 2.6 and 2.2 on the scales for depression and masculinity-femininity, with the P_s score higher on the depression scale, and C_H higher on the masculinity-femininity scale; while for C_H–P_{sy} on the masculinity-femininity scale the critical ratio is 2.1, C_H being the higher score.

Table 6 compares the P_m group with the P_s and P_{sy} groups. In every instance on the main scales the higher score is made by the more disturbed group. Significant differences are seen in the P_m–P_s comparison on all scales, the critical ratios being respectively 3.1, 4.1, 3.0, 3.6, 3.1, 3.8, 3.6 and 3.3 for hypochondriasis, depression, hysteria, psychopathic deviate, masculinity-femininity, paranoia, psychasthenia, schizophrenia, and hypomania.

In the comparison of P_m–P_{sy}, only on the schizophrenia scale is a significant difference apparent, the critical ratio being 3.0, with P_{sy} the higher score; but to be noted are the critical ratios of 2.5, 2.3, 2.7, 2.0 and 2.5 on the scales for depression, psychopathic deviate, paranoia, psychasthenia and hypomania respectively—all scores being higher for P_{sy}.

Table 7 compares the P_s–P_{sy} clinical groups, where no significant differences can be observed. However, it is interesting to note that the trend is for the P_s group to score higher on the scales for hypochondriasis, hysteria, masculinity-femininity, and psychasthenia; while the P_{sy} group is the higher on the scales for depression, psychopathic deviate, paranoia, schizophrenia and hypomania.

Summary

As indicated earlier this is not an experiment in the usual laboratory sense; yet, every effort was made to maintain standard conditions for all groups and to prevent the intrusion of uncontrollable variables or artifact. The value of the Multiphasic Inventory as a predictive instrument and clinical tool depends upon its agreement with the clinical diagnoses. This is, of course, open to many pit-falls: the lack of a common psychiatric language; the lack of clear-cut clinical criteria for identifying personality abnormalities; the failure of an individual under study to present uncomplicated symptoms or to present crystallized behavior patterns; the lack of time for making a prolonged study of the individual.

This explains to an extent the lack of greater definiteness in the diagnostic groups employed here. No attempt has been made to define the groups beyond the major classifications. Since a clinical evaluation had to be made with the minimum expenditure of time consistent with good procedure, and since verification of the clinical diagnoses was generally unpracticable, greater precision here would not mean necessarily substantiation in fact or in composite psychiatric or psychological opinion. Table 8 shows the recommendations made and the actual disposition on the 121 cases of this study. This is purely pragmatic. It must be borne in mind that final disposition of these cases rested with a board of medical or line officers, few of whom had any genuine training in psychology or psychiatry. Yet, this subjective system was in agreement with the clinical psychological-psychiatric findings minimally at 62.8%; 41.3% were discharged; 17.4% were placed on a limited duty status, and 4.1% were sent to a general hospital for further observation and disposition. The follow-up data are deficient in 29.8% of the cases studied. These men were returned to duty, but the percentages could not be ascertained as to which were for full duty and which for limited status. All of the psychiatrists making diagnoses were qualified neuropsychiatrists. Two of them were fellows in the American Psychiatric Association. Three of these showed little or no interest in the Inventory (or any psychometrics beyond intelligence examinations); the fourth neuropsychiatrist who had been on duty at the Consultation Service was definitely interested in the Inventory but purposely refrained from consulting it until after he had made a clinical evaluation.

The several profiles of Figures 1–5, and Tables 3–7 indicate the agreement of the test with the clinical findings and point out its potentialities as an aid in differential diagnosis. Objective comparison of the diagnostic groups with a normal group has demonstrated statistically significant differentiations (Table 3). Even between the diagnostic groups, one finds distinctive and valid differences (Tables 4–6), typifying, or peculiar, to a general class of disorder or diagnostic group. Thus, the depression scale appears as an indicator of the seriousness of the disintegration; being lower than both hypochondriasis and hysteria in the psychopathic group and mild neurotics, and higher in the severe neurotic and psychotic groups.

The lack of statistical significance between the P_s group and the P_{sy} group (Table 7) may be due to the small number of cases in the P_{sy} group and its large standard deviations. Qualitatively, however, the profiles are different (Figs. 4 and 5). It is to be noted that the peaks for hypochondriasis, hysteria and psychasthenia are more pronounced than the other scales for the P_s group; while, in the P_{sy} profile the peaks are for depression, paranoia and schizophrenia.

Table 8

Recommended Action and Final Disposition of the C_p, C_H, P_m, P_s, and P_{sy} Groups

		Discharge		Limited Duty		Full Duty		Admit. to Gen. Hosp.		Returned to Duty: Type Unknown			
		n	% within Group	*n*	% within Group	*n*	% within Group	*n*	% within Group	*n*	% within Group	*n*	%
C_p	N.P. Recomm.	6	54.5	2	18.2	2	18.2	1	9.1	—	—	11	100
	Actual	3	27.3	1	9.1	0	0	1	9.1	6	54.5	11	100
C_H	N.P. Recomm.	7	100	0	0	0	0	0	0	—	—	7	100
	Actual	6	85.7	0	0	0	0	0	0	1	14.3	7	100
P_m	N.P. Recomm.	2	7.7	13	50	10	38.5	1	3.8	—	—	26	100
	Actual	2	7.7	5	19.3	1	3.8	0	0	18	69.2	26	100
P_s	N.P. Recomm.	48	75.0	1	1.6	5	7.8	10	15.6	—	—	64	100
	Actual	32	50	14	21.9	6	9.4	3	4.7	9	14.0	64	100
P_{sy}	N.P. Recomm.	10	76.9	1	7.7	0	0	2	15.4	—	—	13	100
	Actual	7	53.8	1	7.7	2	15.4	1	7.7	2	15.4	13	100
Totals (of all cases)	Recomm.	73	60.3	17	14.1	17	14.1	14	11.5	—	—	121	100
	Actual	50	41.3	21	17.4	9	7.4	5	4.1	36	29.8	121	100

The more probable explanation for the apparently close relationship between these groups (and also between C_P–P_{sy} and C_H–P_{sy}) is the grossness or overallness of the classifications used here together with the generally non-crystallized reaction types.

That the test is sensitive is further suggested in the N_o group. The profile for this group is generally slightly below the T-score mean of 50. but has a peak on the paranoia scale. In terms of its own gestalt, this would indicate a slight reduction in affect and a slight fixation of ideas. When one considers (cf. Table 1) that this group has been in the Service somewhat longer than the clinical groups and that they have met with more success (attained higher ranks) than the other groups, one is intrigued by the N_o profile. It is essentially stable and essentially normal. Yet, it does differ from the expected T-score average and from the normal profile as found by Leverenz (8). Could this be the healthy, experienced soldier's profile—phlegmatic and purposeful—or has there developed in this group a subtle personality alteration?

Provocative, too, of further investigation in the N_o group are the slightly elevated L and F scores. Has this group learned to put its best foot forward, but within affectively controlled limits, and at the same time has it become possessed with an idea, has it a singleness of purpose?

Conclusion

The purpose of this paper has been to present some findings on the use of the Minnesota Multiphasic Personality Inventory in a clinical situation. The cases were all male white enlisted men of the Air Force who had been studied at the Consultation Service of a personnel replacement pool. Of the cases seen, 98 were problems solely of administration and became the normal group. A total of 121 cases was seen because of maladjustment to the Army situation and these were subsequently diagnosed through standard practices by qualified neuropsychiatrists as either: constitutional psychopathic state, inadequate personality; constitutional psychopathic state, sexual psychopathy; psychoneurosis, mild; psychoneurosis, severe, or psychosis. Diagnoses were made independently of the Inventory. The data thus gathered indicate that the Multiphasic Inventory did in this empirical situation:

1. Distinguish graphically and with statistical significance between normal soldiers and those diagnosed as constitutional psychopaths; mild or severe neurosis; and psychosis.
2. Differentiate with significance between major clinical groups.
3. Present qualitative differentials, or hints for clinical query, in the more disintegrated or anomalous personality disorders.

The data are in agreement with Leverenz' (8) observation that

although the clinical impression may not be corroborated always by the scores, the clinician is made aware of one or more personality abnormalities that require evaluation.

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Use of the Minnesota Multiphasic Personality Inventory in Vocational Advisement *

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At each of the 53 regional offices of the Veterans Administration the Advisement and Guidance Subdivision in the Vocational Rehabilitation and Education Division determines the need for rehabilitation of disabled veterans and provides vocational counseling services leading to the selection of appropriate employment objectives. The work of rehabilitation, including advisement and training, is conducted in accordance with instructions developed by the Central Office of the Veterans Administration in Washington, D. C., to effectuate the provisions of Public Law No. 16, 78th Congress, as amended. The vocational advisers in the Subdivision use army or navy records, case histories, interviews, and vocational information for their contributions to an appropriate vocational choice. In addition, the results of valid, reliable, and well-standardized tests play a considerable role in the advisement, and are administered as deemed necessary in the advisement process. This advisement process has been described by Brophy and Long (1).

At the Minneapolis facility, the Advisement and Guidance Subdivision uses an extensive test battery which includes the Minnesota Multiphasic Personality Inventory as a measure of personality. The need for a personality test in vocational advisement is recognized as particularly acute since over half of the medical discharges from our armed forces have been for neuropsychiatric disorders. However, these disorders have been diagnosed only within the unique and tense framework of life in the armed forces and need to be related to the framework of civilian society. The Minnesota Multiphasic Personality Inventory was included in the personality measures because it appeared well standardized in terms of various clinical categories that could be related to vocational fields.

After a preliminary interview in which the provisions of the law and the regulations concerning vocational rehabilitation are explained to him, the veteran is assigned to an adviser who interviews him in order to

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complete a comprehensive survey of his background. On the basis of this interview, the adviser indicates on a worksheet the appropriate tests to be administered by the psychometrist. The Minnesota Multiphasic Personality Inventory is usually indicated. The veteran then begins his testing. When it is done, he returns to his adviser who discusses employment objectives with him on the basis of the records, the previous interview, and the test results.

The elements that comprise a counseling interview form a complicated pattern from which it is difficult to isolate for evaluation specific kinds of data. However, it is apparent in many cases that a test result, a physical or mental disability, an aspiration, or a family ambition, indicates so important a characteristic of the individual's behavior that it dominates the interview and the choice of the employment objective. Traits bearing this relation to the choice of an occupation are not infrequently revealed by the Minnesota Multiphasic Personality Inventory, even when no single scale is sufficiently elevated to indicate a clinical abnormality. Consideration of the several scales of this test and their use in the advisement of veterans in the Minneapolis office of the Veterans Administration during the first several months of the rehabilitation program will serve to illustrate the usefulness of the Multiphasic Inventory in this program.

The summary of interpretations and uses of the inventory in vocational counseling that follows is offered as the accumulated experience of the Rehabilitation and Education Division of the Minneapolis office of the Veterans Administration. It is the outgrowth of clinical experience rather than the statistical results of controlled experiments. It is hoped that experimental data may soon become available; pending such results, it is felt that these interpretations may serve as a useful guide in the employment of the test.

Use of the Scales

Elevation on the scales of Hypochondriasis, Depression, and Hysteria has occurred more frequently than on the other scales of this test. Such elevations often indicate severe limitations on the kinds of work a man is willing to undertake, most frequently eliminating dirty or heavy jobs. Also, it often indicates the desirability of a job at the lower end of the man's ability level, where a minimum of stress will be encountered; and the avoidance of such high-pressure occupations as selling, investigational, or promotional work. Similarly, when Paranoia and Schizophrenia scales are elevated, the relatively routine, well-regulated job is preferable to work requiring initiative, self-discipline and social contact, as these functions are particularly difficult for those with this withdrawn

type of personality. By contrast, elevation on the Psychopathic Deviate and Hypomanic scales indicates the type of personality most likely to adjust in jobs of a relatively undisciplined nature, where individual initiative and aggressiveness are at a premium, and which afford a maximum of variety in work processes, locale, or associates.

Elevation on the scales indicative of paranoia, psychasthenia and schizophrenia has been encountered less frequently than on the other scales. When elevation on these three psychotic scales does occur, a less favorable prognosis of vocational success is indicated than would accompany elevation on the other six scales. A simplified program of training and employment appears advisable, with avoidance of occupations where the skillful maintenance of social relations is an important factor in success. Outstanding in such personalities are the less desirable, less utilizable forms of adjustment than may be associated with elevations on the other scales. Hypochondriacs, depressives, and hysterics show symptoms with which associates may sympathize; in the psychopathic deviates and hypomaniacs the deviations may be self-compensating or even rewarding in certain occupations; the effeminate man may be the best-adjusted one in a number of professions. But the paranoid, schizophrenic and psychasthenic forms of adjustment have no apparent advantages or compensations to balance the disapproval and penalties that are placed upon them. These adjustment-patterns appear to be obstacles to success in practically all occupations and require the poorest prognosis of vocational success.

The Masculinity-Femininity score is often the most difficult to interpret. It is sometimes depressed considerably below obvious manifestations of effeminate behavior and interests, and it is often high without any overt manifestations or expressed interests to confirm it or give it significance in terms of vocational advisement. There may be a dichotomy between feminine interests that can be acceptably and even successfully related to social relationships and occupational fields, and femininity or inversion of a socially unacceptable nature. In spite of these interpretative difficulties, this scale is frequently a useful guide to the counseling interview, indicating aesthetic propensities that can be related directly to a vocational field, or an effeminacy that contra-indicates vocational fields where tough-mindedness is desirable.

Test Battery Employed

In order to illustrate a few of the many ways in which the Multiphasic Inventory has proved useful in vocational advisement, a brief description of the test battery of which the Multiphasic Inventory is a part will be

presented, and case histories will be examined. Each case is purposely selected to be typical of a group of cases; unique or spectacular illustrations have been avoided. Although the Multiphasic results are described more fully here than is the information provided by the other tests, the latter must not be and have not been overlooked in counseling.

The test battery that was administered to the cases to be described was as follows: Academic ability: Unit Scales of Aptitude, Vocabulary and Analogies, Otis Self-Administering Tests of Mental Ability, and the Ohio State University Psychological Test, Form 21, for college ability. Clerical aptitude: Minnesota Vocational Test for Clerical Workers. Mechanical aptitude: Revised Minnesota Paper Form Board Test, Minnesota Spatial Relations Test. Manual dexterity: Minnesota Rate of Manipulation and O'Connor Test of Finger and Tweezer Dexterity. Vocational preferences: Kuder Preference Record, Strong Vocational Interest Blank for Men (Rev.). Personality: Minnesota Multiphasic Personality Inventory. All norms are in terms of general late adolescent or adult populations, except where otherwise specified.

Scores, when given, are standard scores, except for the Kuder Preference Record which is in percentiles. The abbreviations used in reporting the Minnesota Multiphasic Personality Inventory scores are: ?, Cannot Say; L, Lie; F, Validity; Hs, Hypochondriasis; D, Depression; Hy, Hysteria; Pd, Psychopathic-Deviate; Mf, Masculinity, Femininity; Pa, Paranoia; Pt, Psychasthenia; Sc, Schizophrenia; Ma, Hypomania. For detailed information on the Minnesota Multiphasic Personality Inventory see references in the bibliography.

Illustrative Cases

L. S. This high school graduate is 22 and single. He had been in the Navy for 4 months, 3 months in training to be a radio operator, and 1 month in the hospital for serious delusions, depression, and anxiety. He was discharged for psychoneurosis rated 10% disabling. He applied for rehabilitation because his present work as a shipping clerk does not challenge him or offer a future, because he does not have the "background or amount of confidence" to fit him for other work, and because he cannot do work "calling for quick thinking or courage." He primarily wants to train for a career in music, secondarily to manage an auto parts or some other business. He states, "I think my will can overcome the difficulties" which might interfere with success.

On all tests but two, his academic, mechanical, clerical, and manual abilities and aptitudes are well above average. His highest points are the clerical tests, at the 99th and 97th percentiles. His preferences are for literary and musical work, with the Clerical-Computational pattern

secondary. The Multiphasic Personality Inventory scores are: ? 50, L 50, F 80, Hs 65, D 70, Hy 67, Pd 86, Mf 98, Pa 67, Pt 92, Sc *99*, Ma 63.

This man was completely ineffectual in the interview situation. He looked down at the floor continuously, would respond only minimally and in a whisper, and was entirely amenable and suggestible to the adviser's words. He used abstract terminology, showed no aggressiveness, and in general lacked orientation to the real world. The Multiphasic Personality Inventory revealed enough extreme psychotic tendencies to warrant hospitalization at worst, and at best, an employment objective of low enough level to place him under minimal stress, yet respectable and clean enough to avoid irritating him with its physical demands.

There was no evidence of musical ability except for expressed interest in song writing. He showed some appreciation of the difficulties involved in making a living in the field of music, and the desirability of being able to earn a living in a more stable field. Bookkeeping appeared to meet his needs and abilities best and was entered as his objective. As soon as possible, this man should be referred for psychiatric aid. The strong schizophrenic trend indicated by the Multiphasic Personality Inventory and the interview situation make continuing success in any employment objective doubtful, although he is doing excellent work in his training at present.

J. M. This 22 year old veteran is a high school graduate. He came in to apply for rehabilitation because he was not qualified for any skilled job, and his present work, being unskilled, offered no future security. He had no expressed vocational preferences except for "desk work" which he "could do even if (he) didn't want to." His disability rendered his left arm useless for moderate or great muscular exertion.

His academic ability was above the average of the general population but below the average of college freshmen; his mechanical aptitude and manual dexterities were generally above average. His tested preferences were for persuasive, artistic, and literary work. The Minnesota Multiphasic Inventory scores were: ? 50, L 50, F 55, Hs 65, D 53, Hy 60, Pd 50, Mf *69*, Pa 50, Pt 66, Sc 67, Ma 68.

The first interview had revealed no evidence of the deviate personality tendencies which were later indicated by the Multiphasic. After the Multiphasic results were available, however, he was questioned more closely about his training, experience, and interests, in an attempt to discover the significance of the elevation in Mf. The Preference Record was also available, indicating literary and artistic interests, which were associated with his Mf score.

The second interview revealed not only some artistic interest, but

actual commercial art school training and extensive spare time work at cartooning. He was reluctant to mention this background, he said, because he had been unable to finish paying the art school. The adviser's impression was that he also wanted to avoid appearing effeminate or artistic.

He later brought in his work and it was judged favorably by a commercial artist. To objectives suggested before he mentioned his art work, he had raised minor objections; later when an objective in art was suggested, he showed considerable relief. He was entered into training as a commercial artist where he is very happy and conscientious with his work. His chances for success appear excellent.

J. J. J. J. is a 29 year old man, with ninth grade education. He was a cook in the army and has a long work record that includes a variety of semi-skilled and unskilled jobs mainly on farms and in lumber camps. He feels he needs schooling to qualify for light work which he has been told is all he can handle now, and considers his present job as a Railroad Ashman too insecure. His rated disability is valvular heart disease, 80% disabling; he is in the class of heart disease ranked next to the completely bedridden on a five point scale.

Test results indicate a man of low academic ability, average clerical ability, and high mechanical aptitude and manual dexterities. His tested preferences are for mechanical and artistic work, with the clerical field secondary. The Multiphasic Inventory scores were: ? 50, L 70, F 50, Hs 53, D 70, Hy *75*, Pd 47, Mf 51, Pa 41, Pt 39, Sc 40, Ma 43.

High point on the Multiphasic was Hysteria, with the Lie score and Depression also elevated. During the interview this veteran showed considerable concern about getting a "good deal," particularly looking for security. His only objection to his present work was that it was too insecure; actually it is heavy work that he should not be able to do if his disability were purely organic. This evidence together with the Multiphasic Inventory evidence prompted a discussion with the cardiologist in which he stated that the disability was probably not as bad as rated on the basis of the evident organic symptoms.

With this information, the advisement was subject to less limitation and it was possible to discuss with the veteran a fairly broad range of jobs in the mechanical field that involved up to a moderate amount of physical activity. The objective agreed upon was that of office machine serviceman involving a moderate amount of physical exertion which was not originally considered medically feasible.

There was considerable evidence of emotional disturbance in this man's frequent job changes, his indecision about what occupation he now

wants to enter, the incompatibility of his present work and his disability, and his desire for education without specific reason. The Hy, D and L scores of the Multiphasic Inventory were valuable indicators of the form of his maladjustment.

J. G. This 20 year old unmarried veteran left school while in the tenth grade, joining the Navy as a fireman to begin what he planned to be a Navy career. He was discharged with pulmonary tuberculosis for which he receives maximum compensation. He began his advisement very certain that he wanted only to be a bookkeeper, and stated that he saw no use in the testing and advisement for him as he knew what he wanted and would fight until he got it.

Test results revealed above average academic ability, high mechanical aptitude and somewhat above average manual dexterities. On the clerical tests, he scored at the 9th percentile on Numbers and at the 31st percentile on Names. His interests were Computational-Clerical primarily, and Mechanical and Persuasive secondarily. The Multiphasic scores were: ? 50, L 50, F 53, Hs 53, D 51, Hy 58, Pd 47, Mf 53, Pa 35, Pt 41, Sc 47, Ma *63*.

Although the Ma score is not high in terms of absolute norms, it is high relative to the individual pattern, and is indicative of the strongest characteristic in this man's behavior. His behavior during his hospitalization and since his discharge confirms the Ma score. He practically forced his way out of the hospital, prematurely according to the doctors, and has insisted on immediate action throughout his dealings with the Veterans Administration, often to his disadvantage.

This veteran did not show sufficient clerical aptitude to render bookkeeping a desirable employment objective, and the personality inventory was higher on overproductivity of thought and action than one would associate with successful bookkeepers; nor was there evidence from the background or interview, of basis for his firm decision. The decisiveness of his decision was a function of his personality. The interview confirmed the Multiphasic Inventory, and it proved futile to attempt to find a rational basis for his preference, even though it was apparent that sales or mechanical work would be a more appropriate choice. Because of his insistence, he was permitted entrance into training as a bookkeeper. Prognosis for success in training was doubtful, and already reports on his progress indicate that he is "not putting forth his best effort," which he attributes to the effect of the weather on his lungs.

E. M. This single, 28 year old Negro veteran suffered a foot infection that required several months hospitalization and left him with limi-

tations of motion of his foot and a need to avoid strenuous work. Shortly before discharge from the service he had been removed as platoon leader because of disobeying army regulations.

An intelligent, pleasant man, he made an excellent first impression which was strengthened by the results of aptitude tests showing good abilities for academic and mechanical work. He had previous college training in chemistry and wished to be trained as a pharmacist. His mediocre grades in college he attributed to the fact that he was working several hours a day as an electricians' helper in order to support himself at school. His vocational preferences were in the scientific, social service and clerical fields, thus fully supporting his expressed choice.

Because he completed his advisement early in the history of the program, before the administration of the Multiphasic Inventory had become routine, this test was not given to him. He was inducted into training with no reservations except those arising from the fact that, as a pharmacist, he might have to spend too much time standing on his injured foot, and the further limitations on placement possibilities because of his race.

His University grades were poor on his first examinations. It seemed reasonable to attribute his difficulty to the long interruption in his college training. When they continued poor, a check with his instructors revealed that his basic preparation in chemistry was poor and he did not seem to be making any progress in learning. He was referred back to the Advisement Subdivision with the notation that he apparently lacked the necessary mental equipment to handle college work. Concurrently, he came to the attention of the counseling service of the University, where—in addition to re-tests of scholastic aptitude and objective measures of achievement in academic subjects—the Multiphasic Inventory was given. The results were: ? 50, L 50, F 58, Hs 53, D 56, Hy 49, Pd *98*, Mf 63, Pa 70, Pt 70, Sc *74*, Ma 70.

A comparison of his report of his work and actual grades showed numerous discrepancies, and his reasons for poor previous achievement did not hold up under investigation. The clinical history, on further checking, yielded other data that completed the picture of a constitutional psychopathic deviate.

The re-valuation of his vocational potentialities in the light of the above facts made it apparent that he would not be able to achieve up to his mental ability because of his deficient self-discipline and direction. This line of reasoning resulted in a down-grading of his objective from professional work to the skilled labor of electrical-appliance repairing, thus utilizing maximally his previous experience, taxing his abilities minimally, and affording a fairly wide variety of activities on the job.

R. S. A veteran of the South Pacific campaigns, R. S. was discharged for mixed psychoneurosis, rated as 50% disabling, and in addition states he suffers from recurring malarial attacks. He is 24, and a high school graduate. His employment experience consisted of truck driving and helping in his father's laundry. He feels that he cannot return to any heavy work, is trained for nothing else, and would like to become a Forest Ranger or a Certified Public Accountant.

His tests show about average academic ability and clerical aptitude, and an erratic pattern on mechanical aptitude and manual dexterity tests, with scores more often above than below average. His tested preferences are for mechanical-scientific work, with computational work secondary. The Multiphasic Inventory scores are: ? 50, L 50, F 60, Hs *97*, D 87, Hy 78, Pd 65, Mf 59, Pa 56, Pt 79, Sc 76, Ma 63.

Although he indicated a preference for forestry work, when discussion centered on specific physical demands, he stated that he could not do the manual work involved. His desire for it derived only from the possible college education involved. Neither did the idea of working alone in the forests appeal to him (note elevation on Pt). Mechanical work also, he was afraid, would be too trying for him physically. In spite of only average clerical aptitude, he would consider only bookkeeping as an alternative. This was entered as his objective on the basis of his expressed interests and his personality, since it involved a minimum of physical and emotional stress for him and was not strongly contraindicated.

The primary adjustment in this advisement had to be to the veteran's concern with his health, as the Multiphasic Inventory indicated; D and Hy are concomitants of Hs. Within the one month period since he was assigned to training, he had to postpone entering the program for several days and was absent for about four days since beginning. He is taking medicine for his throat and has complained of trouble with his eyes. The prognosis for his success is only fair, with the strong possibility that his extreme concern with his health will seriously interfere with his training and employment.

Summary

The Minnesota Multiphasic Personality Inventory, as part of the test battery used in vocational diagnosis of disabled veterans applying for rehabilitation, has proved to be an instrument of prime utility. It has served to delineate personality characteristics of crucial importance in the actual choice of a vocation, and has yielded valuable information to aid in prognosis of success in training. In some instances it has revealed personality characteristics that had not previously been recognized, and

in others offered quantitative confirmation of the clinical impressions of a case history and interview.

It is most useful as a part of a well-rounded advisement procedure including tests of vocational aptitudes, mental ability, and vocational interests, and a thorough interview and case history. Improvement of specific scales, particularly the tests of internal validity, which are a unique and valuable aspect of this test, should further enhance its value. Additional clinical and experimental studies of the relation of test scores and patterns of scores to success in various vocations seem likely to extend the usefulness of this instrument in the vocational guidance clinic, but its practical value has already been sufficiently demonstrated to justify its employment on a basis of equality with tests of abilities and interests.

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First Impressions of Classmates

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That first impressions exert an important influence in human lives has long been recognized. Meeting new people, visiting strange places, facing unfamiliar situations, are part of the normal course of daily living, and in such circumstances first impressions are often the only guide to action. Where they are not the sole determinants of action, they unquestionably can contribute much towards specific behavior at the time or at future times. When first impressions are favorable, that is, when they elicit reactions anywhere from "love at first sight" to merely an unspecific sense of satisfaction, the natural result is acceptance or a desire for further acquaintance. Where the new situation takes the form of an interview for a job, for example, a favorable first impression on the employer would probably have the realistic result for the prospective employee of getting him the position. On the other hand, a negative first impression, leading to rejection and inclination to avoid further contact, would in the same situation mean failure.

While from a practical point of view some general knowledge of what tends to "make a good impression," or a poor one, is daily put to use in business and social relationships, yet very little is known specifically about first impressions. A study of their nature would therefore seem to be of considerable value, not only for its practical application, but for its value in helping to understand human behavior in general.

The college campus at the opening of the school year presented what appeared to be worth-while means of studying the nature of first impressions. A freshman class had just arrived. The setting was new, and first impressions during the early weeks of adjustment were discoverable in the choice of friends and of clubs, and the ease or difficulty of orientation to the college routine. Since social patterns are quickly set in new situations, the impressions of these early weeks were to have their influence, in all probability, on the entire school career of these students.

The writer had worked out, on a former occasion, a method for studying first impressions as a means of facilitating the orientation of a freshman *Clothing and Selection* class. Her own first impressions of the students as a group had been varied. To her they seemed hopeful, expectant, bewildered. As new students, their clothes, hair dress, and

make-up were somewhat different from the campus mode. She believed that these students would be able to derive most benefit from the course if they could see themselves as others saw them and if they could learn to "take it."

It seemed that a technique used with success in one class might have value for the Personnel Department. As a result, four weeks after the opening of the term the present study, with 258 students in the freshman *College Problems* class as participants, was undertaken.

The Problem

The desire for approval, or to be accepted socially by one's associates, is a natural tendency of human beings. But what are the factors that cause one person to be accepted and another to be rejected? What must one be or do to be accepted by others? This study represents an attempt to explore this problem by the following two main lines of investigation:

I. Determining the extent of favorableness of the impressions made by freshman girls upon their classmates; II. Determining the nature of first impressions. In this phase of the study, two questions suggested themselves: *A*. What factors are involved? *B*. What influence do the observer's own characteristics have on her observations?

It was found that 22% of the 258 participants in the study had some degree of acquaintanceship with others in the class, ranging from "slight" to "being a friend." It seemed desirable to retain the data secured for this group and to see if they would reveal interesting comparisons between first impressions and impressions influenced by acquaintance.

The Group Studied. The subjects were women students in the College Problems class for freshmen at Ohio University. Of the 430 members of the class, 401 served as both observers (those who gave their responses) and as subjects (those about whom the responses were made) in the experiment. Twenty-two members helped to conduct the experiment; seven were absent. The subjects were typical college freshmen, women who came from various sections of the United States, but mostly from towns and farms of the state of Ohio.

Procedure. In a study of first impressions it is necessary that the subjects have no acquaintance with one another, or that their acquaintance be so slight as to be negligible. The 430 students were divided into 18 groups of approximately 24 students each. Twenty-two of the experimenter's college class in Clothing and Selection were put in one special group because they were to assist in the experiment. The groups were made up by choosing every seventeenth student from the alphabetically arranged roll. This was done in order to avoid acquaintanceships that

the girls might have formed by sitting next to one another in classes during the five weeks since the opening of the term. Each group met from 11:00 to 11:50 o'clock in separate classrooms in two of the college buildings. The Dean of Women, who taught the weekly College Problems class as one unit, had told the girls in advance that they would meet that day in small groups. They were not informed as to the nature of this meeting, but were told to bring pencils as they would be asked to write. In this way the results obtained would be a cross section of student impressions on the campus on that particular day and at that hour.

The 22 students [1] who had been selected to help with the experiment were trained for their jobs in their regular two-hour laboratory period from 8:00 to 10:00 of the same day. During this period they were told for the first time the nature of the experiment to be conducted in the College Problems class that day, and were asked if they cared to assist. All volunteered. Each girl was assigned to a group; in five cases two students were assigned to a group.[2]

Three graduate students who were student deans also assisted in the experiment. Each student dean was assigned to one floor where the groups were assembled, to aid the student assistants if they needed help and to give encouragement. Each student assistant had the following materials: 1. A list of the names and special numbers of the 24 girls in her group; 2. Twenty-four packs of 3 × 5 index cards, 24 in each pack; 3. Typed directions (to be memorized); and 4. A watch with a second-hand, or a stop-watch.

The assistants were told to call the roll as soon as the bell rang, and to distribute the cards. They then asked the class: "Would you be interested in knowing what 23 girls would be frank enough to say about you? If so, each of you in turn will volunteer to come to the front of the room, state your name, and remain there while your classmates write down their impressions of you on these index cards." [3]

For each subject in turn the girls at their seats took a separate card, wrote the subject's number in the upper right-hand corner, and one of

[1] These students had been observers and subjects in the First Impressions experiment the first week of the term. They had studied the remarks made about them and were working on improvements. They had voted 100% in favor of using the same technique in subsequent Clothing and Selection classes.

[2] The assignment of these students to take charge of particular groups was based on the experimenter's knowledge of the students gained from results on the Bernreuter "Personality Inventory," from results on the Ohio State University Psychological Test, and from the students' work and cooperation in the Clothing and Selection class.

[3] Jennings says that "in order to secure valid data, it is evident that sociometric tests must hold reality value for the subjects to which they are administered." Helen Hull Jennings, *Leadership and isolation*, p. 28, 1943.

the following phrases in the lower left-hand corner: (1) "Don't know her," (2) "Know her slightly," (3) "Know her well," (4) "A friend." They were then given a minute and a half in which to list whatever remarks came to their minds about the subject as she stood before them at the front of the room. When every girl in the group had acted as a subject, the assistant asked the girls to write their own number in the lower right-hand corner of each card. The student assistants in the groups that finished before the end of the hour were told to instruct their girls to go back over their comments and to (1) place a plus (+) sign in front of the comment if they meant it to be favorable, (2) place a minus (−) sign if unfavorable, (3) place a zero (0) if it was in-between. Then each girl put a rubber band around her set of cards, after including a separate card on top which contained her own name and number.[4] All the cards were then collected.

The Findings

As each girl stood before her classmates during the experiment, she elicited several very definite responses from her observers in the form of short comments or remarks, for example, "pretty blonde hair," "good posture," "very kind to others," etc. At the beginning of the experiment the aim was to study first impressions only, but when it was found that a 22% acquaintanceship existed among the students, as noted before, it seemed worth while to study impressions more intensively. The responses were therefore divided into four groups ("Don't know her"; "Know her slightly"; "Know her well"; "A friend") according to the extent of acquaintanceship. The term "first impressions" was reserved for one group only, the "Don't know her" group.

A total of 258 students (or 11 of the 17 groups)[5] completed the experiment and are included in the study findings. They served both as observers and as subjects. As observers they evaluated their responses as: + (favorable), 0 (in-between), and − (unfavorable). The acquaintanceship among these 258 students was 77% "Don't know her," 16% "Know her slightly," 3% "Know her well," and 3% "A friend."

The 258 individual observers gave a total of 19,352 responses, of which 12,149 were favorable, 1,903 were in-between, and 5,300 were unfavorable. This is an average (mean) of 47 favorable, 7 in-between, 21 unfavorable, and a total (mean) of 75 responses by each observer.

[4] The girls were told they need not sign their names on the top card if they were not interested in knowing what their classmates said about them. Of the 401 subjects, 396 signed these cards.

[5] The observers in six of the groups did not have time to make the evaluations, and are therefore not included in this report.

Stated in percentages, the responses were 63% favorable, 10% in-between, and 27% unfavorable.

The observers covered a wide range in number of favorable and unfavorable responses. Where one gave only 6 favorable responses, another gave as many as 105, or, stated in percentages, one gave 14% favorable responses, another 98%. The unfavorable responses ranged from 0 to 63 in number, or from 0% to 86%. One observer gave as few as 38 responses in all; another gave as many as 123.

These results show that the majority of the responses were favorable, the unfavorable responses being less than half the favorable. The observers tended to be definite in their responses, that is, either favorable or unfavorable rather than in-between.

To determine the nature of these students' impressions of their classmates, a detailed study was made of five of the eleven groups[6] by analyzing 9,076 responses made by the 116 girls who comprised the five groups.

The study was begun by first classifying the individual remarks made by the observers in three of the experimental groups being analyzed (these consisted of 3,335 individual responses given by 72 observers). With the aid of two seniors (this provided the student interpretation of student responses) the individual remarks were found to fall under 49 sub-topics. Many of the responses were found to have been repeated several times in more or less the same way. Therefore, to facilitate handling, the entire 3,335 remarks were grouped under 395 different responses under the 49 sub-topics.[7] The 49 sub-topics then seemed to lend themselves to further classification under five general categories: (1) physical characteristics; (2) intelligence; (3) clothing; (4) grooming; (5) psychological factors.

The next step was to obtain the consensus of expert opinion on the classifications. Four qualified members of the faculty made this evaluation: the Dean of Women, the head of the Department of Home Economics, the head of the Department of Psychology, and a member of the Department of Home Economics with a background in Psychology. They determined whether the 395 different responses belonged under the categories and sub-topics in which they had been placed, or elsewhere.

[6] A comparison of the selected five groups with the 11 groups with respect to mean Psychological Test Score, Bell Adjustment Inventory Scores, Degree of Acquaintance, and number and % of responses per observer, shows that they approximated the findings for the eleven groups as a whole, therefore making the study of additional groups unnecessary for the purpose of this experiment.

[7] Many of the sub-topics used by the experimenter and the two seniors were found to have the same meaning as those used by Gordon W. Allport. In these cases, therefore, Allport's terminology was accepted. Gordon W. Allport, *Personality*, p. 403, 1937.

Following is the final classification of categories and sub-topics determined on the basis of these judgments, with a typical response for each sub-topic:

Classification of Impressions, with Typical Responses

I.	Physical Characteristics		
(A)	Physique		
	1. Hair	+	"Pretty blonde hair"
	2. Eyes	+	"Large eyes"
	3. Eyebrows	0	"Eyebrows could be thinned"
	4. Mouth	−	"Not very attractive mouth"
	5. Nose	+	"Cute nose"
	6. Teeth	+	"White teeth"
	7. Complexion	−	"Too pale"
	8. Dimples	+	"Beautiful dimples"
	9. Figure	+	"Good figure"
	10. Height	−	"Too tall for a girl"
	11. Weight	0	"Should lose some weight"
	12. Posture	+	"Good posture"
	13. Carriage	+	"Carries herself nicely"
	14. General characteristics	+	"Very attractive face"
	15. Masculinity-femininity	−	"Boyish in appearance"
(B)	16. Health	−	"Unhealthy looking"
(C)	17. Vitality	−	"Looks worn out"
(D)	18. Voice	+	"Nice voice"
II.	Intelligence		
	19. Abstract	+	"Looks brilliant"
	20. Practical	+	"Looks efficient"
III.	Clothing		
	22. Harmony of parts of costume	−	"Should not wear heels with ankle sox"
	23. Harmony of colors	−	"Too many different colors"
	24. Suitability of clothes to person	+	"Wears becoming clothes"
	25. Suitability to occasion	+	"Wearing suitable school clothes"
	26. Manifestations of taste in dress	+	"Good taste in dress"
	27. Fit of dress	−	"Skirt doesn't fit properly"
	28. Remarks about clothing	+	"Pretty sweater"
	29. Principles of art involved	−	"Bow is too large for its position"
IV.	Grooming		
	30. General remarks	+	"Dresses neatly"
	31. Make-up	−	"Needs more make-up"
	32. Hair dress	−	"Hair could be fixed differently"
	33. Shoes	−	"Shoes could be cleaned"
	34. Nails	−	"Too dark a shade of nail-polish"
	35. Cleanliness	+	"She looks clean"
	36. Laundering	−	"Belt is a little soiled"

V. Psychological Characteristics

21. Manifestations of emotions	−	"Afraid to smile in public"
37. Ascendance—sub-missive	+	"Dominant at times"
38. Expansion—reclusion	0	"Quiet"
39. Persistence—vacillation	−	"A bit flighty"
40. Extroversion—introversion	0	"Acts as if she would be nice after you know her but seems to have a wall you would have to break through first"
41. Self-objectification—self-deception	+	"Imagine she would be sincere"
42. Self-assurance—self-distrust	+	"Seems rather sure of herself"
43. Gregariousness—solitariness	+	"Very sociable or friendly"
44. Altruism (socialization)—self-seeking (unsocialized)	+	"Very kind to others"
45. Social intelligence (tact)—low social intelligence (tactless)	−	"Not always tactful"
46. Directed toward values	+	"Seems serious about college"
47. Radicalism—conservatism	+	"Very conservative type"
48. Observers' likes and dislikes of subject	−	"Don't think I'd like her"
49. General responses	+	"A great deal of charm"

A tabulation was then made of the 9,076 responses of the 116 observers. These were classified according to categories, sub-topics, observers, favorableness, and extent of acquaintanceship. It was thus possible to study impressions from many points of view.

What Factors are Involved in the Observers' Responses?

The groups or sub-topics under which the responses were classified show wide variation in frequency of mention, and also in extent of favorableness. Six of the 49 sub-topics constitute over 50% of the responses: Grooming—general remarks; grooming—hair dress; posture; emotions; self-assurance—self-distrust; altruism—self-seeking. Eighteen sub-topics include 93% of the responses (as indicated in Table 1). These 18 sub-topics also include 1% or over of the total of 9,076 responses. The remaining 31 sub-topics consist of less than 1% each.

The sub-topic of greatest frequency concerned general remarks on grooming, pertaining mainly to neatness. These general remarks and remarks on hair dress (second in frequency) cover 23.7% of all responses; when posture (which is third) is added, they make up 33.9%, or one-third of all the responses. Add the next three sub-topics—emotion, self-assurance—self-distrust, and altruism—self-seeking, and over 50% of all the responses are covered.

The five sub-topics which rank highest in favorable responses are: 1, hair; 2, eyes; 3, altruism—self-seeking; 4, general physical remarks; and 5, taste in dress. For each one of the sub-topics the favorable responses were over 85%.

Table 1

Number and Percentage Distribution of the 18 Highest Ranking Sub-Topics

Rank	Sub-topics No.	Sub-topics Item	Responses No.	Responses % of (9,076)	Evaluation of Responses in Per Cent +	0	−
1	30	Grooming—general remarks	1,224	13.5	82	4	14
2.5	32	Grooming—hair dress	929	10.2	47	10	43
2.5	12	Posture	929	10.2	51	14	35
4	21	Emotions	797	8.8	64	9	27
5	42	Self-assurance—self-distrust	582	6.4	13	27	60
6	44	Altruism—self-seeking	526	5.8	89	3	8
7	43	Gregariousness—solitariness	509	5.6	81	6	13
8	26	Taste in dress	432	4.8	87	6	7
9	14	General characteristics—physical	413	4.6	88	7	5
10	31	Grooming—make-up	378	4.2	17	12	71
11	25	Clothing—suitability to occasion	240	2.6	72	3	25
12	23	Clothing—harmony of color	235	2.6	57	4	39
13	1	Physical characteristics—hair	230	2.5	97	1	2
14	24	Suitability of clothes to person	194	2.1	41	5	54
15	7	Physical—complexion	182	2.0	74	10	16
16	2	Eyes	145	1.6	95	0	5
17	22	Clothing—harmony of parts	139	1.5	31	5	64
18	28	Remarks about clothing	115	1.3	83	8	9
		Total	8,199	90.3			

When an analysis is made of the unfavorable remarks, it is obvious that four sub-topics—make-up, harmony of parts of costume, self-assurance—self-distrust, suitability of clothes to person—rank highest in that order, and all are over 50% of the responses in each sub-topic.

The procedure in this experiment was such as to produce (reasonable expectancy) self-consciousness in the individual subjects, yet 27% of the self-assurance—self-distrust responses were neither favorable nor unfavorable, and these ranked highest of the in-between responses.

Relationship between Categories and Acquaintanceship Groups

A study of Table 2 makes possible the following generalizations regarding relationships between categories and acquaintanceship groups.

1. Psychological responses constitute the greatest proportion of the total responses, 30% of the total number. They are also most frequent in all acquaintance groups, except the "Don't know her" group, where responses concerning grooming are slightly in the lead. This tends to indicate that grooming is most obvious to the stranger, but as the girls

Table 2

Percentage Distribution of Responses (116 Observers)

Category	Don't Know Her	Know Her Slightly	Know Her Well	A Friend	All Groups
Physical	24.0	24.2	27.0	24.8	24.2
Intelligence	1.1	.8	.5	.9	1.1
Clothing	15.8	14.8	12.2	13.3	15.4
Grooming	30.3	27.2	22.7	22.6	29.3
Psychological	28.8	33.0	37.7	38.5	30.2
Total	100.0	100.0	100.1	100.1	100.2
N =	6,899	1,558	393	226	9,076

become better acquainted, responses of a psychological nature increase, this increase, in this study, being 9.7%. They seem to indicate that strangers tend to comment about grooming, while acquaintances tend to comment concerning traits, attitudes, and temperament.

2. Grooming responses take second place and show a decrease as acquaintanceship increases, this decrease being 7.7%, namely, from 30.3 to 22.6%.

3. The responses of a physical nature take third place in "All Groups" and in the "Don't know her" and "Know her slightly" groups, and second place in the last two groups. The better acquainted the girls were, the more they tended to comment about physical characteristics and less about clothing and grooming. Responses of a physical nature also remain almost constant for each acquaintance group, namely, about 24%.

4. Clothing takes fourth place in all acquaintance groups. The clothes the students wore elicited comment only half as frequently as grooming or psychological characteristics. Clothing responses remain nearly the same for each group, ranging from 12 to 15%.

Relationships between categories and acquaintanceship groups, as influenced by favorableness, are indicated in Table 3. Certain inferences can be drawn from the percentages given.

1. A large majority of the 9,076 responses indicate favorable impressions—62% favorable to 28% unfavorable. The proportion is five favorable responses to three unfavorable and in-between combined. This majority of favorable responses is true for the total responses in all five categories. This finding corroborates Jennings' statement that "positive expression for participating with others was practically twice as great as the expression of rejection." [8]

[8] Helen Hall Jennings, *Leadership and isolation*, p. 59, 1943.

Table 3

Per Cent of Favorable and Unfavorable Responses Classified According to Acquaintanceship Group and Category (116 Observers)

Category		Don't Know Her	Know Her Slightly	Know Her Well	A Friend	Total
Physical	+	67.5	70.0	84.0	91.1	69.3
	0	9.9	8.0	3.8	1.8	9.0
	−	22.7	22.0	12.3	7.1	21.7
	Total	100.1	100.0	100.1	100.0	100.0
	N =	1,653	377	106	56	2,192
Intelligence	+	74.4	69.2	100.0	100.0	74.7
	0	14.1	23.1	00.0	00.0	14.7
	−	11.5	7.7	00.0	00.0	10.5
	Total	100.0	100.0	100.0	100.0	99.9
	N =	78	13	2	2	95
Clothing	+	62.3	69.7	77.1	86.7	64.6
	0	5.5	5.2	00.0	3.3	5.2
	−	32.2	25.1	22.9	10.0	30.2
	Total	100.0	100.0	100.0	100.0	100.0
	N =	1,088	231	48	30	1,397
Grooming	+	56.5	64.5	74.2	76.5	58.7
	0	7.6	7.1	1.1	2.0	7.2
	−	35.9	28.4	24.7	21.6	34.0
	Total	100.0	100.0	100.0	100.0	99.9
Psychological	+	56.0	66.3	68.2	87.4	59.7
	0	13.3	11.7	10.1	5.8	12.6
	−	30.7	22.0	21.6	6.9	27.8
	Total	100.0	100.0	99.9	100.1	100.1
	N =	1,987	514	148	87	2,736
Total	+	60.1	67.3	75.1	85.8	62.6
	0	9.5	8.7	5.1	3.5	9.0
	−	30.4	24.1	19.9	10.6	28.3
	Total	100.0	100.1	100.1	99.9	99.9
	N =	6,899	1,558	393	226	9,076

2. Responses of a physical nature show a greater per cent of favorable responses (omitting intelligence) than clothing, psychological or grooming, as shown in the "Totals" column of Table 3, the percentage being 69.3.

The fact that comments regarding physical features were usually favorable became quite noticeable while reading the 19,352 responses. It is interesting to note that unattractive features of the face were rarely commented on. Most of the 21.7% of unfavorable comments in the

physical group concerned posture (42.4%), a factor which usually can be corrected.

3. Clothing and grooming show the greatest per cent of unfavorable responses (30 and 34 respectively). These features can be changed; therefore the girls may have felt they could be critical.

4. The in-between responses show the greatest per cent of responses in the psychological category and the next greatest in the physical. Again, the general tendency of the observer is to refrain from responding, or to give an indifferent response, if the feature is one that cannot be easily changed.

5. An increase in the extent of acquaintanceship is accompanied by an increase in favorable impressions, as shown in the per cent of total responses, where the percentage increase is from 60.1 for "Don't know her" to 67.3 for "Know her slightly," 75.1 for "Know her well," and 85.8 for "A friend." This increase is true for each of the individual groups,—physical, clothing, grooming, and psychological.

6. The per cent of increase in favorable comments with acquaintanceship (that is, from "Don't know her" to "A friend") was sharpest in the psychological category,—31.4%. As the students became better acquainted they showed a greater tendency to remark favorably about psychological factors. Grooming shows the least gain, 20%.

What Influence do the Observer's Own Characteristics Have on Her Observations?

As noted before, the personality adjustment of each student was obtained from results on the Bell "The Adjustment Inventory" and her intelligence score on the Ohio State University Psychological Test. It seemed that certain inferences could be drawn from the observer's characteristics, as revealed by these tests, and her observations.

1. Correlations between the observers' scores on the separate sections of the Bell-Adjustment Inventory and the favorable responses made by the observers show coefficients less than .089, except in the case of Bell (Home) and favorable impressions where $r = .28$, a value significant at the .01 level. This seems to indicate a slight tendency for students with satisfactory home life to give favorable responses about their fellow-students.

2. The observer's personality adjustment (Bell-Total) and the kind of responses the observer makes—physical, clothing, grooming, or psychological—seem to be independent of each other. Each of the four correlations has a numerical value less than .13, and these are not significant at the .01 level.

What influence does the observer's intelligence have on the kind of response she makes?

1. The observer's intelligence (Ohio State University Psychological Test) and the favorable responses she makes seem to be independent of each other ($r = -.10$). The more intelligent observer, on the whole, is about as favorable in her responses as the less intelligent observer.[9]

2. The observer's intelligence and the kind of response she makes—physical, clothing, grooming, or psychological—seem to be independent of each other, except in the case of clothing where $r = .34$, being significant at the .01 level. This seems to indicate that there is a tendency for students who are above average in intelligence to make more than an average number of comments about clothing. College women on the freshman level are clothes-conscious. It is possible that the more intelligent girl may be more observant, and also that she may know more about the latest mode, or what is correct in costume, than the less intelligent girl.

3. The more intelligent observer tends to give a greater variety of responses than the less intelligent: $r = .32$, this being significant at the .01 level. This may indicate that the less intelligent student tends to make the same type of comment in giving her impressions, limiting her statements to a few sub-topics.

Certain other factors seemed to influence the observer's impressions.

1. Observers differ in their taste in dress. One remarked about a subject: "She dresses nicely" (+). Another stated of the same subject: "Anklets don't match dress" (−).

2. Observers differ in their standards of grooming. One remarked: "Well groomed" (+), while another's comment about the same subject was: "Could be more neatly dressed" (−).

3. Observers differ in their interpretation of traits and attitudes. One observer remarked: "Looks friendly" (+), while another said of the same subject: "Looks like she might be hard to get along with" (−).

4. Observers differ in their conception of "Good looks." One observer remarked about a subject, "Not attractive" (−), while another remarked: "She has simple beauty" (+), while a third described her as "Fairly attractive" (0).

Summary

This study of impressions of one's classmates shows that the freshman girls included in the study were favorable in their evaluations of their

[9] Buck found a low correlation between thinking and behavior. Buck, N. M., and Ojemann, R. H., Relation between ability in scientific thinking and behavior in situations involving choice. *J. exper. Educ.*, 1942, 11, 217.

classmates rather than unfavorable or neutral. There were three favorable responses for every two unfavorable and in-between combined. This would indicate that the "frankness of modern youth" is of a kindly nature rather than the opposite.

The 9,076 responses made by the 116 observers were found to fit in the five selected categories: (1) physical characteristics; (2) intelligence; (3) clothing; (4) grooming; (5) psychological characteristics, such as traits, attitudes, and temperament. They also could be broken down into the 49 concrete factors of varying importance in the judgment of these freshman girls. However, over 50% of the impressions were covered by 6 sub-topics and 90% by 18 sub-topics (see Table 1).

Of the five categories, responses of a psychological nature were most frequent, with grooming second, physical characteristics third, clothing fourth, and intelligence fifth. Students who were not acquainted tended to remark on grooming, but as acquaintance increased they tended to comment increasingly on psychological characteristics. Degree of acquaintanceship has little effect on the per cent of responses of a physical or clothing nature.

Characteristics of a physical nature, especially the face and features, were commented on favorably more frequently than other factors. On the whole, the students were very considerate when nothing could be done to correct a defect. But they were equally critical when grooming or clothing was concerned.

There seemed to be no significant correlation between a student's own personality adjustment and her inclination to give favorable or unfavorable responses, or to comment about physical, grooming, clothing, or psychological factors. Where the girls had favorable home conditions, however, they tended to respond favorably.

Nor was there significant correlation between a student's intelligence and her favorable or unfavorable replies or her responses regarding physical, grooming, clothing, or psychological characteristics. They seem to be independent of each other, except in the case of clothing, where there appears to be a slight tendency for the more intelligent girl to comment about clothes.

The responses showed that students vary greatly in their taste in dress, their standards of grooming, in their interpretation of traits and attitudes, and in their criteria for "good looks."

The responses of a physical and clothing nature are about constant for the four acquaintance groups. But responses regarding grooming decrease as acquaintanceship increases, while psychological responses increase with acquaintanceship.

Within the limits and limitations of this study, the results may sug-

gest the pattern of responses necessary to get along with other people. Although limited in scope, its findings may point the way to areas which need development.

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The Value of Aptitude Tests for Factory Workers in the Aircraft Engine and Propeller Industries *

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The general problem of this investigation might be stated as follows: to develop a testing program for a company manufacturing radial and opposed types of aircraft engines, and to investigate the feasibility of using these same tests for upgrading the supervisory forces of three dissimilar companies of the same parent corporation.

Both factory and supervisory jobs were investigated at Lycoming Division—The Aviation Corporation. This industrial plant manufactures aircraft engines involving all the jobs necessary to the precision machining of engine parts. Only the supervisory jobs were investigated at a foundry, Spencer Heater Division—The Aviation Corporation, and at a propeller plant, The American Propeller Corporation.

More specifically the investigation was designed to determine whether tests at the Lycoming engine plant would:

a. Assist in the selection of new employees without previous experience in this type of industrial activity.

b. Assist in the selection of new employees for work in fields as machine operation, inspection, engine testing, the more skilled production jobs.

c. Assist in the selection of new employees to be trained as skilled workmen, as tool room workers, tool designers.

d. Assist in the problem of upgrading and promoting employees to supervisory positions.

e. Assist in the better adjustment of employees.

The investigation was further designed to determine whether these same tests utilized in the Lycoming plant could be used to assist in the problem of selection, and promotion of employees to supervisory positions in all three of the plants studied.

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Criteria for Measuring Job Success

A job rating made by the worker's superior was utilized to measure success on the job.

Each workman was rated good, average or poor on his job. If he had been transferred from one job to another, the reason for the transfer was ascertained.

The employee's immediate supervisor was also asked what good and poor points the ratee exhibited. The reason for transfer and the comments were used as checks on the rating; if they did not parallel the rating, the supervisor was checked to determine the reason for the difference.

The criteria used were the best possible for this particular situation; and the work of securing the criteria was carefully executed. Ratings were secured by several trained workers who contacted personally supervisors familiar with the ratees. No rating was made unless one or more supervisors thoroughly familiar with the work of the ratee could be found. Because of "war conditions" inside the plants this was sometimes difficult and critical.

The reliability of the criteria was found in two situations. These checks were made by having a trained departmental instructor rate the operators, and then securing a rating through the production supervisor as explained above. The reliability coefficients secured were: Production Engine Testers, .91 (N-42); Inspectors, .705 (N-36).

Procedure

Test results were secured in two ways. Some groups of experienced operators were tested. Each of these operators had six months or more experience on a job, and it was assumed that he had proved satisfactory on that job or that he would not have been allowed to remain on it. Ratings were secured on these groups in the usual way after testing.

New applicants for jobs also were tested. Those applicants who were successful in securing jobs were followed up after six months or more in the plant, and ratings secured on them.

The following tests were used in the investigation: Otis Quick-Scoring Test of Mental Ability, Beta, Form A; Revised Minnesota Paper Form Board, AA; Bennett Test of Mechanical Comprehension, Form AA; O'Rourke Test of Mechanical Ability, Jr. Gr.; and Minnesota Vocational Test for Clerical Workers, Number Comparison.

The use of the O'Rourke test was abandoned early in the investigation because of its length, and because it proved to be almost useless with female applicants, many of whom simply didn't try to take it. Further,

as more and more persons were hired from other than industrial occupations, the basis for this test seemed not to be suitable.

The value or effectiveness of the tests is assessed in terms of simple percentage figures indicating the extent to which their use increased the effectiveness of the current personnel procedures. That is, by how much will the tests increase the effectiveness of the present hiring job as shown by the percentage of good operators hired.

Although it is believed that the correlation does not give a true picture of the results, they are also presented in the form of biserial *r*'s for those technicians who prefer to think in these terms.

Results are presented in a number of histograms and tables. Summaries of the tables are given here.

Table 1 presents a summary of the recommended minimum critical scores and the per cent improvement effected in the selection of excellent workers.

Table 1

Improvement Effected in Selection of Excellent Workers by Selected Minimum Critical Scores, Lycoming Division—The Aviation Corporation

	Otis Q.S. Test of Mental Ability, Beta A		Minnesota Paper Form Board, Rev.		Bennett Test of Mech. Comprehension, AA	
Job Group	Minimum Critical Score	% Improvement Selection, Excellent Workers	Minimum Critical Score	% Improvement Selection, Excellent Workers	Minimum Critical Score	% Improvement Selection, Excellent Workers
Toolmaker learners (N-64)	51	9	33	7	36	5
Inspectors (M & F) (N-49)	51	27	37	29	M-34	12
					F-19	28
Engine testers (N-45)	46	19	21	—	33	10
Job setters (N-25)	34	17	30	30	36	47
Foremen (N-99)	35	9	24	8	30	10
Machine operators (M & F) (N-81)	31	10	21	8	M-27	22
					F-18	12

Table 2

Average Improvement Effected in Selection of Excellent Workers, All Jobs, Lycoming Division*

Test	Mean Improvement in Selection Excellent Workers at Minimum Critical Score	Mean Improvement in Selection Excellent Workers at Q_1
Bennett Test of Mechanical Comprehension, AA	18.2%	19.0%
Otis Test of Mental Ability, Beta Test, Form A	15.1%	16.2%
Revised Minnesota Paper Form Board, AA	13.6%	14.0%

* The means given in the Table are not weighted by the N's but are averages of percentages by job categories. This was done because the mean of the different job categories and not of the number tested was desired.

Table 2 was developed by the simple expedient of averaging the results secured by each test for all job categories in the Lycoming Plant (see Table 1). Table 2 gives the mean per cent of improvement in selection effected at the various Minimum Critical Scores and at Q_1. These means indicate that the Bennett Test was on the whole the most effective of the three, with the Otis Test next and the Revised Minnesota Paper Form Board the least efficient.

Table 3

Correlations Between Job Ratings and Test Scores, Lycoming Division—The Aviation Corporation

	Biserial *r*		
Job Group	Otis Q.S. Test of Mental Ability, Beta A	Minnesota Paper Form Board, Revised	Bennett Test of Mechanical Comprehension, AA*
Inspectors	.52 ± .09	.50 ± .09	.665 ± .13
Engine testers	.57 ± .13	.16 ± .17	.17 ± .17
Machine operators	.48 ± .08	.38 ± .08	.44 ± .08
Foremen	.39 ± .07	.47 ± .07	.465 ± .07
Job setters	.46 ± .14	.59 ± .13	.73 ± .10
Tool room learners	.485 ± .09	.42 ± .09	.46 ± .09
Mean bis,**	.49 ± .035	.44 ± .04	.52 ± .03

* All correlations in this column are for male only. The inspectors and machine operators are the only two categories affected. All other job groups have no female workers.

** The method used for averaging was that recommended by Garrett, *Statistics in psychology and education*, Longmans, p. 284. Each *r* was squared, the squares averaged, and the square root extracted of the average thus obtained.

Averaging the *r*'s in Table 3 seems a justifiable procedure because the *r*'s did not differ greatly in size and one of the objectives of this investigation was to determine to what extent certain tests exercised discrimination in a relatively large number of job classifications.

Conclusions

1. The three tests most extensively used selected excellent workers in the following order reading from the most to the least effective; that is, the Bennett Test was the most selective, the Otis next, and the Minnesota Paper Form Board the least efficient of the three.

2. Job-success on the purely manual-type job in the Lycoming plant shows no relation with the test scores. Discussion of these jobs has been omitted from this report.

3. Job-success on the jobs requiring skill, such as machining precision parts, testing aircraft engines, and inspection was found to relate positively and significantly with the test scores, in varying percentages or degrees.

4. The large range of aptitudes found in the industrial plant studied indicates that tests might best be used for assignment of employees to a job category or level rather than to specific jobs. In other words the function of a testing program should be primarily the better adjustment of workers.

5. The Minnesota Number Checking Test used in studying Production Engine Testers seems not to have a wide enough application on other types of work to warrant its use with other groups.

6. Under tight labor conditions tests in general must be usable with both men and women. A test such as the Bennett Test of Mechanical Comprehension, if usable with both men and women with little variation in range, would be much more valuable in many cases.

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Studies in International Morse Code

4. A Note on Second-Level Training in Code Reception

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In the first paper of this series,[1] there was described a new procedure for teaching beginners to recognize the thirty-six principal signals of International Morse Code. Essentially, this procedure involves the presentation of an auditory signal to the student and a subsequent identification of the signal by the instructor, with a short pause between signal and identification, to permit the student to write down the appropriate character (letter or digit). The signals are transmitted and identified individually; one hundred signals, arranged in random order, constitute a practice "run," after which the student is given a brief rest-period in which to sum his errors and enter the total in a "box-score" record.

Although no sharp line may be drawn between this early training in the accurate recognition of individual signals and the later practice in slow-speed reception of a series of signals, it is convenient to distinguish between the stage in which the fundamental stimulus-response relationships are established and that at which *speed* of response becomes all-important. The former may be termed "first-level," and the latter, "second-level," training.

The present report is concerned with two variations of a method of second-level training which have proved to be effective in bringing students of college age from a code speed of five words[2] per minute (5 w.p.m.) to speeds as high as 20 w.p.m. in less than fifty-five hours of instruction. In either form, this method differs from those commonly used in training centers, in that (1) it provides the student with knowledge of his progress at practically every moment throughout the entire period of instruction; (2) it encourages close attention to *all* signals transmitted within any practice session; and (3) it provides regular rest pauses at increasingly frequent intervals as the student advances in speed.

[1] Keller, F. S. Studies in International Morse Code. 1. A new method of teaching code reception. *J. appl. Psychol.*, 1943, 27, 407–415.

[2] A "word" is here treated as any five-character group of letters and digits randomly arranged—e.g., AR24P, B8GRX, etc.

Variation 1. The first variation of this method requires as many operators or automatic sending-machines as there are different speeds at which students within a group are qualified to work. In a class of twenty or thirty college students, with available code-speeds of 5, 7, 10, 12, 15, and 20 w.p.m., more than three instructors are seldom needed in order to meet the problem of individual difference in progress; but a larger or less homogeneous group of students might require the services of four, or possibly five, operators transmitting at as many different speeds.

Following the satisfactory completion of first-level training, the student is introduced to a 5-w.p.m. rate of transmission. Signals continue to be sent in runs of one hundred each, with all characters represented with equal frequency, in haphazard arrangement. The signals are not, however, individually identified by the instructor as in first-level training. Instead, at the end of each run, he "calls back" the phonetic equivalents (Able, Baker, Charlie, Dog, etc.) of the signals just transmitted, and the student checks, or corrects, his erroneous or omitted characters. The same practice sheets are used, and error totals are recorded in the same box-score form, as in first-level training (1, see Figs. 1 and 2).

At a 5-w.p.m. rate of transmission, a run of signals requires four minutes, and four or five minutes may be consumed in checking errors, as the characters are called back, and in recording scores. It is usually possible to transmit five runs within a fifty-minute practice session. At higher rates of speed, of course, a larger number of runs may be given, although the between-run interval remains fairly constant.

Students are advanced from one speed to another as soon as they have reached some arbitrarily chosen degree of proficiency. The results reported in this paper are based upon a mastery criterion of three successive runs in no one of which the student made more than five errors or omissions. This was also the criterion of first-level proficiency, as well as that in the procedure next to be described.

Variation 2. This variation of the calling-back method may be employed when a single instructor, working with a single sound source, is required to give instruction to a group of students. It is usually introduced while first-level training is still going on, and it differs from Variation 1 only in that it calls for the transmission of signals at different speeds to the same students during the same class hour. In order to accomplish this, the instructor may proceed, in stepwise fashion, from the slowest to the highest speeds at which his students are able to work, giving most practice at the speed suitable to the greatest number of students. Thus, when a few students have qualified at the first level of training, a single run of 5 w.p.m. may be introduced at the end of the

class hour; when more students reach this level, more 5-w.p.m. runs may be added; when the 5-w.p.m. speed is mastered by some students, a 7-w.p.m. run may be introduced; and so on throughout the training period. As soon as all of the students, or all but one or two, have qualified at the lowest speed in use, then, of course, that speed may be omitted entirely.

Table 1

Progress of Two Groups of College Students in Receiving Morse Code under Two Variations of Second-Level Instruction

Speed (w.p.m.)	Group I (Variation 1)		Group II (Variation 2)	
	Hours* (50-minute)	Number of Students	Hours* (50-minute)	Number of Students
5	17.8	40	18	56
7	23.1	38	25.4	56
10	35.9	33	37.5	55
12	44.7	22	51.5	24

* The values in the "Hours" columns are cumulative. The decreasing number of students at higher code speeds is due in part to withdrawal of students from college.

Table 1 presents some illustrative data on the total training time required for students to qualify at four successive levels of code speed under the two conditions described above. Code classes were held one "hour" daily (50 minutes), five days a week, and the practice periods were devoted wholly to receiving. All students were inexperienced in code at the beginning of training and all but three or four were able to master the 10-w.p.m. speed before the course was ended. A few men reached the 15-w.p.m. level and one reached 20 w.p.m., in less than fifty-five hours, but the number is too small to warrant table entries. Three men only failed to qualify at 5 w.p.m. The difference between the means for the two groups is in part due to the fact that, under the second variation of procedure, the slower men were retarded because of the infrequency of runs at the speed which they were seeking to master.

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Job Specifications in Applied Psychology

Note: The editor will be glad to receive job descriptions and specifications in the fields of applied psychology. These will be published from time to time to provide information for students, applied psychologists, employers, and employment agencies.

Personnel Technician (Tests and Measurements) *

Introduction. This series includes all classes of positions, the duties of which are to construct and administer or supervise the construction and administration of psychological measures, including aptitude tests, intelligence tests, achievement and trade tests, questionnaires, rating scales, etc., to be used as aids in the selection, placement, training, and promotion of civilian and military personnel.

It is believed that the following statements of standards for the positions of personnel technicians (tests and measurements) cover the majority of operating positions in the War Department field service. Positions of higher grade are found on the staff level. These staff positions involve the formulation of policy and procedures to be used in the construction and administration of psychological measures throughout the War Department.

Two general types of positions operating in the War Department field installations are representative of classes properly allocable to this series: 1. Positions involving the construction, validation, and standardization of psychological measures. 2. Positions involving the administration, scoring of psychological measures, and the interpretation and application of the results of these measures to the placement, training, and promotion of civilian and military personnel.

Positions in the Personnel Technician Series may be allocated from grades P-1 through P-5 depending upon the following factors which are interrelated and should not be considered independently:

1. For positions involving the construction of psychological measures.

a. Degree of instruction and guidance given incumbent by superiors.

b. Presence and degree of responsibility for technical accuracy of completed projects.

c. Presence and degree of responsibility for planning and direction of program and projects.

* These job specifications were prepared by the Salary and Wage Administration Branch, Civilian Personnel Division, Office, Secretary of War, for use in classifying civilian positions in War Department field establishments.

d. Responsibility for training other personnel technicians of lower grade.

e. Amount of psychological knowledge required in the performance of assignments.

2. For positions involving the administration of psychological measures.

a. Degree of instruction and guidance concerning technical procedures given incumbent by superiors.

b. Presence and degree of responsibility for recommendations concerning placement, training, and promotion of personnel tested.

c. Degree of interpretation and application of test results.

d. Presence and degree of individual accountability for accuracy of results.

e. Presence and degree of responsibility for planning and direction of program.

The following definitions may aid in the complete understanding of these standards:

Aptitude test. One which predicts degree of success or failure in some field or activity.

Achievement test. One which determines level of skill or range of information which an individual has acquired.

Objective test. Short item tests in which there is little disagreement among those who know the subject matter concerning correctness of answer.

General ability. General intelligence or classification test—a group or battery of tests such as vocabulary, general information, arithmetical reasoning, and spatial relations which measure the grade or level of the individual's mental ability.

Validity. The degree to which a test measures the traits or trait it purports to measure.

Reliability. The degree to which a test produces the same results or score upon retest.

Norm. The distribution of scores obtained from a representative sample of the population for which the test is designed.

Process of standardization. Involves the determination of the validity and reliability and the establishment of norms for psychological tests.

Skill. A developed or acquired ability to perform a task, group of tasks, trade, or craft.

Test battery. A combination of carefully selected tests designed to determine certain aptitudes, abilities, achievements, or skills.

Performance test. A type of mental test in which the role of language is greatly reduced, the test material consisting of concrete objects or

pictures, and the responses consisting of manipulation or assembling of these objects, e.g., mechanical assembly test, work sample.

Correlation technique. A statistical method applied in obtaining the degree of relationship existing between two sets of measures, such as test scores. There are several types of correlation techniques. For example, biserial, tetrachoric, multiple, partial, etc. Each technique utilizes a different statistical formula. The determination of the specific technique to be used depends on the nature of the problem, the data available, and the degree of accuracy and form of results desired.

Central tendency. A measure or score representing the middle of a group, e.g., mean, median, or mode.

Dispersion. The extent to which a group of measures such as test scores vary from central tendency.

Personnel Technician, P-1

The area of responsibility of grade P-1 personnel technicians is limited by specific instructions and continuous technical supervision by professional personnel of higher grades. Incumbents at this level usually serve as trainees in order to become familiar with the techniques and tools necessary to perform more responsible work in the field of psychological test construction and administration. All of their work is reviewed for technical adequacy, accuracy, and conformance to standardized procedure.

Personnel technicians at this grade collect background material concerning the subject, trade, or skill for which the test, rating scale, questionnaire, etc., is to be constructed. Following outlined sources of material, they study technical manuals and other sources of occupational information, and interview foremen, supervisors, and skilled workers in the field analyzing their jobs in order to determine the essential skills and steps involved in the adequate performance of the work. They perform assigned statistical analyses of data from test studies conducted in the field and on tests constructed by other members of that unit as part of the test standardization process. Following defined procedures, they apply simpler statistical techniques such as correlation formulae to test data in order to determine the reliability and validity of tests.

Grade P-1 personnel technicians, following specific instructions concerning test specifications, subject matter to be covered, types of items, weights, time element, etc., construct objective test items for a variety of subjects, trades, or skills. They may edit test items for conformance to the accepted style (choice and arrangement of words) written by other personnel technicians at this grade, following detailed instructions and samples of items.

Personnel technicians in this class, applying their professional educational background and following specific instructions, analyze, evaluate, and abstract pertinent material relating to test construction and testing procedures from scientific and professional journals.

Grade P-1 personnel technicians functioning in a testing unit administer and score a variety of individual and group tests of aptitudes and abilities following specific instructions concerning choice of tests and methods of administration and scoring. While working at this level, they receive instruction and guidance from personnel technicians concerning interpretation of test results and application of these results to the placement and training of personnel.

Personnel Technician, P-2

Grade P-2 personnel technicians work under supervision of personnel technicians of higher grade, receiving instructions concerning the general procedures and techniques to be followed in completing an assigned project or portion of a project, but working out details on own initiative, and selecting a specific technique from several standardized procedures. Grade P-2 personnel technicians, although advanced beyond the preliminary training period, are given training and instruction on the more difficult phases of their assignments. Their work is reviewed for technical adequacy, accuracy, and conformance to standardized procedures.

Personnel technicians at this level select sources to be used and collect and analyze technical background material concerning the subject, trade, or skill for which the test, rating scale, questionnaire, etc., is to be constructed. They conduct interviews with foremen, supervisors, and skilled workers in the field, analyzing their jobs in order to determine the essential skills and steps involved in the adequate performance of the work. Following established criteria, they select significant factors from the information gathered and they convert job information into valid objective test items.

Grade P-2 personnel technicians, following instructions concerning test specifications, general format of test, subject matter to be covered, types and number of items, construct objective test items for a variety of subjects, trades, or skills. They may edit test items written by other personnel technicians at this grade for conformance to the accepted style (choice and arrangement of words).

Personnel technicians at this grade write manuals of directions for examiners and instructions for examinees following format and outline used in previous test manuals.

Personnel technicians at this level perform statistical analyses of data from test studies conducted in the field and on tests constructed by other

members of the unit in order to standardize the tests. Specifically, they determine which formulae to apply to an assigned problem after general plan for statistical study has been outlined by personnel technicians of higher grade.

Grade P-2 personnel technicians functioning in a testing unit administer, score, and interpret a variety of individual and group tests of aptitudes and abilities, i.e., achievement and general intelligence. At this level personnel technicians select the appropriate tests to be administered to personnel being considered for placement, training, transfer, or promotion in order to determine present level of skill, aptitude, suitability for employment, and need for training. The tests are selected on the basis of information obtained by the placement interviewer and on the knowledge which the incumbent has of the uses of specific approved tests in relation to success in the various occupations. Personnel technicians at this grade make preliminary recommendations to the personnel technician in charge of a testing unit concerning the acceptability, placement, and training of the individuals tested, after interpreting the test results.

Personnel Technician, P-3

Grade P-3 personnel technicians receive general instructions concerning objectives of projects but work out details of assignments on own initiative. Their work is reviewed for conformance to technical procedures and established objectives. Personnel technicians at this level review and edit test items prepared by lower grade technicians. This review is made in order to determine whether or not the items of the test conform to established principles and patterns of test construction, are written in clear English, are free of objectionable content, and of a sufficient level of difficulty for the group to be tested, but not too difficult to be of value in differentiating the group.

Grade P-3 personnel technicians following an established plan and purpose for a test or a battery of tests construct objective tests covering a variety of subjects, trades, or skills, and write manuals of directions for examiners and instructions for examinees.

Personnel technicians at this grade review job analyses and trade test items prepared by personnel technicians of lower grade in order to determine whether or not the significant factors concerning the job have been covered by the test items. In performing this function they draw upon their knowledge of jobs and trade tests previously constructed and validated.

Grade P-3 personnel technicians make field trips to posts, camps, and stations in conjunction with personnel technicians of higher grade for the

purpose of administering individual tests of mechanical and other aptitudes, and obtaining data for the purpose of validating tests by comparing test scores with efficiency ratings and other personnel data.

Personnel technicians at this level are responsible for statistical analysis of test data. This function involves selecting specific statistical techniques that pertain to the problem from several accepted methods.

Personnel technicians at this grade assemble and organize information for a project report indicating procedures used in gathering facts and preparing lists of data obtained, analysis of statistical results, validation and standardization techniques and norms established, or conclusions reached from the study.

Grade P-3 personnel technicians may function as assistant chiefs of placement testing units in installations having a large variety of complex jobs. In this capacity they determine work assignments for personnel technicians in the unit on the basis of knowledge of individual technician's experience and qualifications. They discuss these assignments with personnel technicians of lower grade and make decisions concerning tests to be administered and recommendations to be made in instances where the subordinate personnel technicians cannot make the determination.

Grade P-3 personnel technicians may also function as chiefs of placement testing units in installations having a smaller variety of routine and semiroutine jobs. They are responsible for the development and administration of a testing program for improving the placement and training of employees in order to achieve the maximum utilization of manpower skills available to the installation. In this capacity they guide and direct a group of personnel technicians of lower grade engaged in administering, scoring, and interpreting the results of aptitude, performance, trade information, and general intelligence tests. Personnel technicians at this grade make recommendations to the placement and training branches of the installation's personnel office concerning the acceptability, placement, and training of the individuals tested, on the basis of the interpretation of test results and analysis of abilities, skills, and aptitudes of the individuals.

Personnel Technician, P-4

Grade P-4 personnel technicians function independently with regard to technical procedures, but work in conformance with established policies concerning objectives to be accomplished.

Personnel technicians at this level are assigned special studies requiring a broad background of psychological measurements and test construction techniques, i.e., evaluating tests and rating scales already in use by comparing results of different tests. They study groups used

in original validation of tests and rating scales in order to determine what other groups can be tested by these measures. On the basis of these studies they submit recommendations to personnel technicians of higher grade for improvements in specific tests and test construction techniques.

Personnel technicians at this grade have the responsibility for the planning and completion of projects involving the construction of tests and test batteries, questionnaires, rating scales, etc., which measure general ability, aptitude, or achievement to classify individuals on the job, classify them for specialized training, or classify them within training groups, or evaluate the effectiveness of the training program. They are responsible for project reports which include procedures used in gathering facts and preparing tests, data obtained, analysis of statistical results, validation and standardization techniques and norms established, or conclusions reached from the study.

The details of the test construction function include performance or the supervision of the following:

a. Analysis of the job, field, ability, or skill for which the test is to be constructed.

b. Establishment of test specifications including the determination of the type of test to be constructed, the subject matter to be covered, the number of items, weights, time element, etc.

c. Writing of original test items.

d. Organization of the items into tests.

e. Determination of the format of the test.

f. Organization of the tests into batteries.

g. Selection of standardization groups and design of test tryouts.

h. Planning and extension of statistical analyses for determining validity and reliability of the tests, test batteries, etc.

i. Planning and execution of follow-up studies on the tests constructed.

Personnel technicians at this level accompany higher grade personnel technicians on visits to Army installations after requests have been received from such installations for the establishment of personnel procedures requiring the use and application of psychological measures. In conjunction with higher grade personnel technicians they analyze the test needs in terms of the types of jobs found at the installation and the training and skills of the personnel of the installation. The tests may be used as aids in selection, placement, or promotion of personnel and the evaluation of the training programs. In making this analysis, the functions and work flow of the installation are studied, personnel are interviewed, and administrative officials are consulted. After recommenda-

tions concerning testing programs have been approved by the senior member of the team, they instruct installation personnel in uses of tests, methods of administration, scoring, and interpretation. They construct new tests when existing ones do not fit the problem at hand or adapt or extend norms of existing measuring devices to cover the installation personnel.

Grade P-4 personnel technicians advise personnel technicians of lower grades concerning statistical procedures to be applied to particular, unprecedented, or unusual problems. They plan statistical techniques and steps to be used in the determination of the validity and reliability of tests. The steps include intercorrelations of a number of variables, measures of central tendency, measures of dispersion, selection of the minimum number of independent variables which will give maximum production of the dependent variable, item analysis by biserial or tetrachoric correlations and application of measures which indicate whether or not differences obtained are significant. When necessary, new statistical procedures are devised to meet special problems.

Grade P-4 personnel technicians function as chiefs of placement testing units in installations having a large variety of complex jobs. They are responsible for the development and direction of a placement testing program in order to achieve the maximum utilization of manpower skills available to the installation. In this capacity they guide and direct a group of personnel technicians of lower grade engaged in administering, scoring, and interpreting the results of aptitude, performance, trade information, general intelligence tests, questionnaires, and rating scales.

Personnel technicians at this grade make recommendations to the placement and training branches of the installation's personnel office concerning the acceptability, placement, and training of the individuals tested on the basis of the interpretation of test results and analysis of the abilities, skills, and aptitudes of the individuals.

Personnel Technician, P-5

Grade P-5 personnel technicians act with independence in planning projects and in the development of methods and procedures for the conduct of these projects. They receive guidance concerning administrative and technical policies and broad objectives of the program. Their work is reviewed for conformance to these policies and objectives.

Personnel technicians at this level may exercise administrative supervision and technical direction over subordinate professional employees, making final decisions with respect to the most difficult and unusual technical procedural problems which arise.

Personnel technicians at this grade visit War Department installa-

tions after requests have been received from such installations for the establishment of personnel procedures requiring the use and application of tests in order to increase the effectiveness of induction, placement, promotion, and training of civilian employees in clerical, mechanical, subprofessional, professional, and supervisory positions. In this capacity they analyze and evaluate the total personnel program in relation to the specific problem in order to determine whether or not the application of tests will alleviate the problem. When such study reveals that a testing program is called for, they select the appropriate previously constructed tests, or construct new measuring devices to meet the problem. The performance of this function involves the following:

a. Analysis of jobs, flow of work, functional organizations, and training curricula and standards.

b. Evaluation of qualifications and performance of present incumbents.

c. Conferences and interviews with employees, supervisory and administrative officials, and with the members of the staff of the installation civilian personnel office.

d. Planning and developing of new test forms and procedures.

e. Preparation of manuals of direction for administration and scoring of tests and interpretations of results.

f. Determination of adequate criteria for test validation and devising procedures for measuring individual job productivity, both qualitatively and quantitatively.

g. Experimental tryouts of preliminary test forms, statistical analysis of data obtained, revisions for final test battery, and establishment of norms for group.

h. Training of installation staff in method of administration and scoring of tests and interpretation of results.

i. Conducting of follow-up studies of testing programs instituted in order to recommend revisions in standards or in measuring instruments.

On these visits to field installations, personnel technicians at this level advise and assist management on other phases of personnel administration such as training, placement, and employee relations, applying their psychological knowledge and experience to the specific personnel problems of the installation.

Grade P-5 personnel technicians may plan, organize, and direct the work of a staff of professional employees of lower grades engaged in the construction and statistical validation of a variety of tests and test batteries to be used in the selection, placement, training, and promotion of employees.

Book Reviews

McMurry, Robert N. *Handling personality adjustment in industry.* New York: Harper and Brothers, 1944, pp. xi+297. $2.50.

The author states that this book is written to give business executives insight into the sources and solutions of problems in personnel administration and industrial relations. Although this ambitious goal is not fully attained, the book will give a fresh point of view to any business leader who is progressive enough to read and consider its contents. Perhaps the book's greatest contribution, however, will be to give academic industrial psychologists greater insight into actual industrial conditions.

The material on labor relations is the outstanding section of the book. Several original and provocative ideas regarding labor-management relationships are presented. The author contrasts the ineffective means of solving labor problems with some techniques that have been effective in determining the true causes of strife: the exit interview, grievance committee, employee opinion poll, and the home interview.

For the most part, clinical psychology, psychiatry and psychoanalysis have neglected the industrial field. Industry, in turn, has not recognized the importance of the personality and emotional factors that affect it. The material in this book will help to remedy this situation. Many books on industrial psychology emphasize the measurement of aptitudes and intellectual factors. This book, on the contrary, emphasizes emotional and motivational factors necessary for success on the job.

Much emphasis is placed on the diagnosis of personality disorders but very little attention is given to treatment techniques. No mention is made of non-directive therapy which is being used with good results in several industrial situations. The author points out that many business executives have personality problems themselves, but the suggestion is never made that these disorders might yield to treatment.

Much of the material in the sections on selection and training is valuable although not related to the topic of personality problems in industry. The chapter on "The Home Interview" is presented entirely as a selection procedure, although it would have been more relevant if centered around the theme of personality problems.

The last thirty-three pages of the book constitute a manual to train employment interviewers in the theory of personality. The psychological principles set forth are questionable in places, as on page 259 where we read:

"The emotions, on the other hand, do not need to mature. They function perfectly at birth. The day-old infant experiences rage and fear as intensely as does the adult. In short, emotional reactions do not have to be learned."

Business and academic people interested in human relationships in industry will derive considerable help from this book.

Charles C. Gibbons

Owens-Illinois Glass Company
Toledo, Ohio

Gallup, George. *A guide to public opinion polls.* Princeton: Princeton University Press, 1944, pp. xviii+104. $1.50.

Applied psychologists will welcome this book because it contains just the type of information to which skeptics or the uninformed may be referred when they desire to learn something about this relatively new technique. It deals with twelve general topics such as the function of public opinion polls in a democracy, the cross section, formulating questions, size of the sample, and polling accuracy.

The plan of the book is novel and effective. From the first page to the last, it gives a series of questions together with brief answers. The total number of questions is 80 covering almost every conceivable aspect of polling. The answers, though brief, are straight-forward, factual, and convincing.

In dealing with the question of accuracy in the prediction of elections, Gallup makes out a good case for the steady reduction of error from the notorious 19 per cent error of the *Literary Digest* in 1936 to the one or two or three per cent errors in the prediction of elections in later years. In the opinion of the reviewer, however, this problem is not faced with complete candor. The *constant* errors in the *Literary Digest* fiasco are described at some length but the presence of such *constant* errors in the Gallup 1940 presidential election poll is not mentioned. The reviewer refers to the fact that the 1940 Gallup poll underestimated the Roosevelt vote in state after state. Surprisingly enough, the Gallup poll was unable to overcome this type of error in 1944 when it overestimated Roosevelt's vote in ten states and underestimated it in 38. But this specific defect should not blind one to the general accuracy and the widespread utility of the Gallup poll and of other equally reliable polls. They are important instruments in ascertaining public opinion not only with respect to social and political issues, but also in market research, industrial relations, education, and all other fields where opinions, beliefs, and attitudes must be taken into consideration in dealing with human beings.

Donald G. Paterson

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Dvorine, Israel. *Color perception testing charts (Vol. 1); Color perception training charts (Vol. 2).* Baltimore: Published by the author, 1944. $25.00.

These charts are of the pseudo-isochromatic type. There are 60 perception and 70 training plates. Tests for naming colors and for training in color naming are included. The colors employed are based on the subtractive color theory. The author erroneously lists the three primary colors as red, yellow and blue instead of red, green and blue. The perception test is not limited to investigation of red-green and blue-yellow deficiencies but yields information on perceiving both primary and secondary colors. The author considers that some individuals who are listed as color blind are only confused by certain color combinations. These, although classified as color blind, readily improve when given color perception training. It is claimed that these charts will avoid uncertainty and error in measurement of color perception. The only classifications attempted from responses are: normal in naming and perceiving colors, correct naming with defective perception, incorrect naming and normal perception, incorrect naming and defective perception. There is no attempt to designate a person as red-green color blind, etc.

The training charts "educate" or coach people to name colors and to pass pseudo-isochromatic color-blind tests such as for the Navy or the Air Corps. It would seem that *the widespread use of these training tests would tend to nullify the usefulness of all pseudo-isochromatic tests of color vision.*

Miles A. Tinker

University of Minnesota

New Books, Monographs, and Pamphlets

Crime and the human mind. David Abrahamsen. New York: Columbia University Press, 1944. Pp. xiv + 244. $3.00.

Dvorine Color Perception Training Charts. Israel Dvorine, O.D., 2328 Eutaw Place, Baltimore 17, Maryland. 2 volumes. 130 color charts. $25.00.

Absenteeism: management's problem. John B. Fox and Jerome F. Scott. Boston: Division of Research, Harvard Business School, 1943. $1.00.

Conserving marriage and the family. Ernest R. Groves. New York: The Macmillan Company, 1944. Pp. 138. $1.75.

From gods to dictators. Pryns Hopkins. Girard, Kansas: Haldeman-Julius Publications, 1944. Pp. 168. Paper $1.00. Cloth $1.65.

Experiments on the effects of music on factory production. Willard A. Kerr. Applied Psychology Monograph. Stanford University: Stanford University Press, 1944. $1.00.

Psychotherapy in medical practice. Maurice Levine. Chicago: Macmillan Company. Pp. xiv + 320. $3.50.

Teamwork and labor turnover in the aircraft industry of Southern California. Elton Mayo, George F. Lombard and associates. Boston: Division of Research, Harvard Business School, 1944. Pp. 30, 24 charts, 8 tables. $1.00. (Business Research Studies No. 32.)

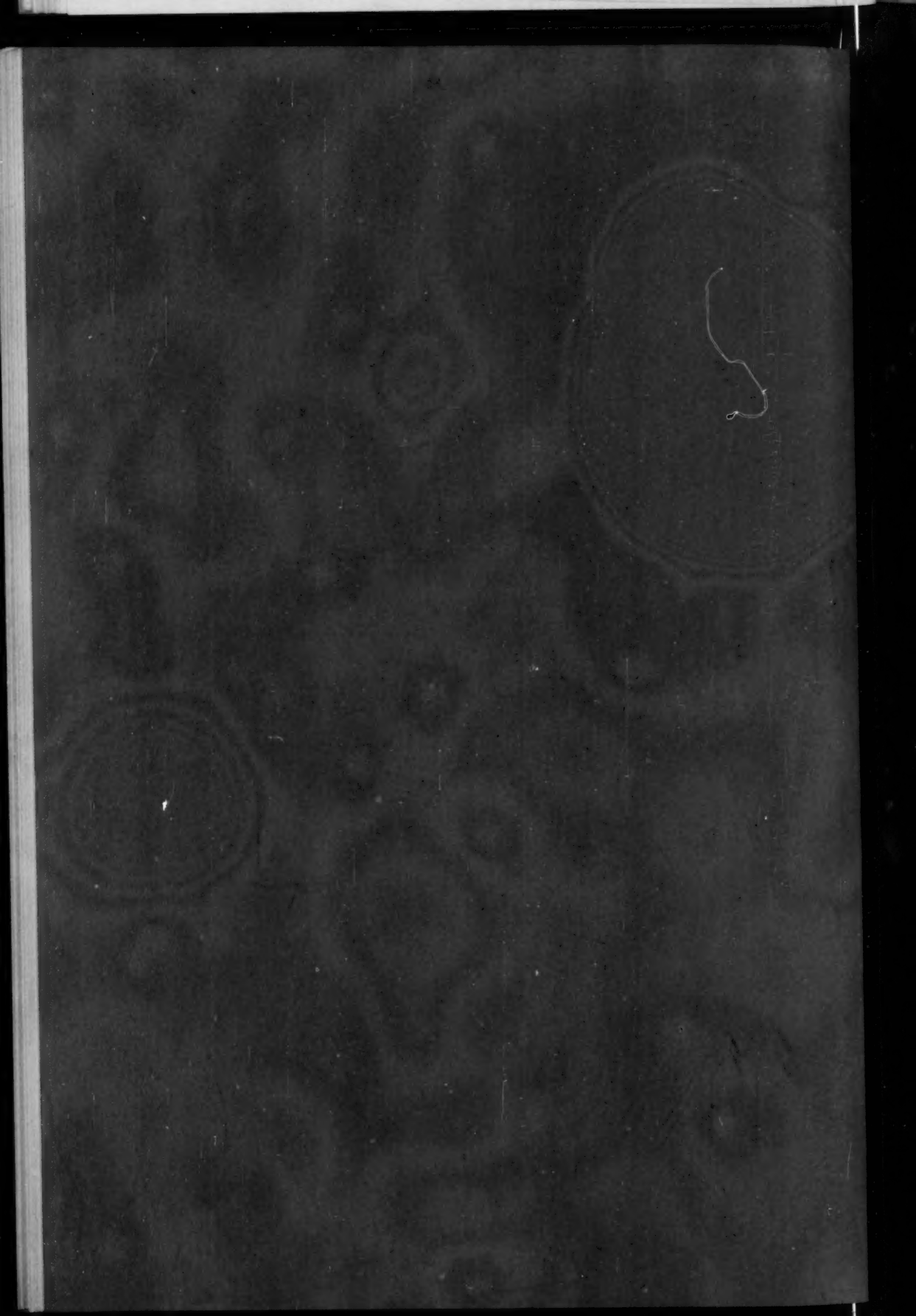
Learning by exposure to wrong forms in grammar and spelling. John R. McIntosh. New York: Bureau of Publications, Teachers College, Columbia University. Pp. 61. $1.75.

Emotional factors in learning. Lois B. Murphy and Henry Ladd. New York: Columbia University Press, 1944. Pp. x + 410. $3.50.

Women and men. Amran Scheinfeld. New York: Harcourt, Brace & Company, 1944. Pp. 453. $3.50.

Psychodrama in the schools. Nahum E. Shoobs. New York 17: Beacon House, 1944. Psychodrama Monographs, No. 10. Pp. 19. $1.50.

Glossary of technical terms. Calvin P. Stone. Stanford University: Stanford University Press, 1944. Pp. 15. $.25.

A factorial study of perception. L. L. Thurstone. Chicago: University of Chicago Press, 1944. Pp. 148. $2.50.

The place of reading in the elementary school program. Board of Education of the City of New York. Educational Research Bulletin No. 7. Pp. 43.